Vol. 35, No. 2 February, 2024

ISSN 1029 - 385 X (Print) ISSN 2519 - 7134 (Online)

MEDICAL FORUM MONTHLY

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- Registered with Press Registrar Govt. of Pak bearing No.1221-B Copr. Since 2009
- ABC Certification Since 1992
- On Central Media List Since 1995
- Med. Forum Published under Medical Academic Foundation (MAF) from Lahore Since 1989
- Open Access, Peer Review & Online Journal
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MEDICAL FORUM MONTHLY

ISSN 1029 - 385 X (Print) ISSN 2519 - 7134 (Online)

APNS Member CPNE Member ABC Certified

Peer Review Journal Online Journal Published Since 1989

e-journal available on: www.medforum.pk

Medical Forum Recognized and Indexed by

PMDC-IP-0048 (1998), HEC-Y-Category (2009), Pastic and PSA, Isd (2000), Medlip,Karachi (2000), NLP, Isd (2000),Pakmedinet, Isd (2011), Excerpta Medica, Netherlands (2000), EMBASE Scopus Database (2008), Index Medicus (IMEMR) WHO (1997), ABC Certification, Govt. of Pak. (1992), Central Media list, Govt. of Pak (1995), Press Reg. No.1221-B Copr (2009)

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Mobile Nos. 0331-6361436, 0300-4879016, 0345-4221303, 0345-4221323.
E-mail: med_forum@hotmail.com, medicalforum@gmail.com
Website: www.medforum.pk

Printed By: Naqvi Brothers Printing Press, Darbar Market, Lahore.

Rate per Copy: **Rs.3000.00**

Subscription Rates : (annually) Pakistan (Rs.30000.00), USA & Canada (US$ 500.00), China, Japan, UK &Middle East (US$ 450.00)

Med. Forum, Vol. 35, No.2 February, 2024 ISSN 1029-385-X (Print) ISSN 2519-7134 (Online)

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Editorial

Role of Fruits, Vegetables, Spices, Cereals, Pulses, whole Grains in the Management of Diabetes

Mohsin Masud Jan
Editor

Diabetes is a chronic, silent killer disease that occurs either when pancreas does not produce enough insulin or when the body cannot effectively use the insulin.

According to International Diabetes Federation (IDF), Diabetes Atlas 2021 reports that 10.5% adult (20 to 79 years) has diabetes with half unaware that they are living with condition. Diabetes around the world in 2021 was 537 million adults and now-a-days 440 million people worldwide have diabetes over 90% have type 2 diabetes which is driven by Socioeconomic Demographic, Environmental and Genetic factors.

Diabetes has become a serious and increasing global health burden. An estimated 382 million people worldwide were affected by diabetes in 2013, and this number is expected to rise to 592 million by 2035[1]. Consequently, diabetes is predicted to become the major cause of death and disability in the world by 2030[2,3].

According to IDF, 643 million people will have diabetes upto 2030 and 783 million upto 2045. Pakistan ranks 3rd in the world in diabetes.[4] According to the World Health Organization (WHO), the number of diabetics will increase by 170%, by 2025.[5] It is a condition difficult to treat and expensive to manage.[6]

It is important for a person with diabetes or pre-diabetes to understand how the foods, fruits and others they eat impact their blood sugars. A diet rich in fruits, vegetables, spices and their fibers significantly reduces the risk of type 2 diabetes, cardiovascular diseases, stroke and some type of cancer, obesity and alzheimer's disease. Researchers have found that dietary fiber reduces a diabetic's need for insulin, improves blood glucose control, lower blood cholesterol and fat level and also help with weight loss.

Fruits, vegetables, and dietary fibers are very important as part of the diet for health and nutrition. Eat more fruit and vegetables in the diet to provide vitamins and fiber as well as to help keep a balanced overall diet. Fruits and vegetables are very healthy and nutritious as they contain various healthy phytochemicals like vitamin C, provitamine A, minerals, dietry fibers, phytates, and so on. Spices are food adjuncts that have been used as flavoring and coloring agents and as preservatives, and have also been recognized to possess medicinal properties, and their use is seen in traditional systems of medicine for various human disorders, including diabetes.[7,8]

Healthy eating is a cornerstone of healthy living – with or without diabetes. But if you have diabetes, you need to know how foods affect your blood sugar levels. It's not only the type of food you eat, but also how much you eat and the combinations of food types you eat.

A high fibre diet (40 grams per day but start slowly) may help control or prevent diabetes.

Choosing nutrient-rich foods can help you feel full without raising your blood sugar too much if you have diabetes. This can include avocados, chickpeas, and almonds. When you have diabetes, it might be challenging to select healthful snacks. It's important to select snacks that are rich in fibre, protein, and good fats. Your blood sugar levels will be better managed with the aid of these nutrients. Snacking on nutrient-dense foods that advance general health is also crucial. Here we list down foods that people with diabetes can eat. There are five best fruits for diabetics which are apple, guava, orange, papaya and melon because these fruits have high fibre and low sugar. In the cereals with lowest, glycemic index that's 55 or less in the whole grains barley, oats, millet, corn, whole wheat flour, oat flour and brown rice. Best pulses for diabetes chickpeas, kidney beans (Rajma), Bengal gram (dal chana), green gram (dal moong) and black gram (dal urad).

The glycemic index identifies foods that increase blood sugar rapidly. This handy tool allows one to favor foods that have a much lesser effect on blood sugar. High-glycemic-index foods include sugar itself, white potatoes, most wheat flour products, and most cold cereals. Glycemic Index (GI) is a scale that ranks foods by how much they raise blood sugar levels. The higher the glycemic index of a food, the more it raises the blood sugar levels. The goal is to include low GI foods in the diet. These include whole grain foods, fruits, and vegetables. High-protein foods (i.e., meat, poultry, fish, eggs, peanut butter, nuts) have a low GI; choose low-fat / lean-protein foods.[9,10]

Best dry fruits for diabetic are apricots, dates, figs, prunes, almond, walnut, etc.

Hard-boiled eggs are a healthy snack for people with diabetes. Their protein content really makes them shine. One large hard-boiled egg provides 6.3 grams, which is helpful for diabetes because it helps prevent your blood sugar from rising too high after you eat.

For several reasons, yoghurt and berries make a great diabetic-friendly snack. First, the antioxidants in berries may lessen inflammation and shield cells in the pancreas, the organ in charge of secreting hormones that lower blood sugar levels, from damage. Berries are also a fantastic source of fibre. A 1-cup (150 grammes) serving of blueberries, for instance, has 3.6 grammes of fibre, which helps slow digestion and maintain blood sugar levels after meals. Another benefit of yoghurt is that it lowers blood sugar levels. This is mainly because of the probiotics it has, which may enhance your body's capacity to metabolise sugar-containing foods.

Almonds are very nutritious and convenient to snack on. A 1-ounce (28-gram) serving of almonds provides

over 15Trusted Source vitamins and minerals, including 0.6 milligrams or 27% of the recommended daily intake for manganese, 76.5 milligrams or 18% for magnesium and 0.32 milligrams or 25% for riboflavin. Research has shown almonds may help control blood sugar in people with diabetes. In one study, 58 people who included almonds in their diets every day for 24 weeks experienced a 3% decrease in their long-term blood sugar levels.

Chickpeas are used to make hummus, a creamy spread. When eaten with raw vegetables, it is delicious. Hummus and vegetables both include plenty of fibre, vitamins, and minerals. In addition, hummus offers a negligible quantity of protein and fat. People with diabetes who have trouble controlling their blood sugar may benefit from all of these characteristics.

If you have diabetes, snacking on avocado may help manage your blood sugar levels. The high fiber content and monounsaturated fatty acids in avocados make them a diabetes friendly food. These factors may prevent your blood sugar from spiking after a meal.

A key to many diabetes management plans is learning how to count carbohydrates. Carbohydrates often have the biggest impact on your blood sugar levels. For people taking mealtime insulin, it's important to know the amount of carbohydrates in your food, so you get the proper insulin dose.

Plan for every meal to have a good mix of starches, fruits and vegetables, proteins, and fats. Pay attention to the types of carbohydrates you choose.

Too little food in proportion to your diabetes medications – especially insulin – may result in dangerously low blood sugar (hypoglycemia). Too much food may cause your blood sugar level to climb too high (hyperglycemia). Inquire about how to best coordinate meal and medication schedules.

Sugar-sweetened beverages tend to be high in calories and offer little nutrition. And because they cause blood sugar to rise quickly, it's best to avoid these types of drinks if you have diabetes.

Physical activity is another important part of your diabetes management plan. When you exercise, your muscles use sugar (glucose) for energy. Regular physical activity also helps your body use insulin more efficiently. The more strenuous your workout, the longer the effect lasts and it can also improve your blood sugar.[11]

In general, most adults should get at least 150 minutes a week of moderate aerobic activity. Aim for about 30 minutes of moderate aerobic activity a day on most days of the week.

Exercise, especially if you take insulin or medications that lower blood sugar. Exercise can lower your blood sugar levels even up to a day later, especially if the activity is new to you, or if you're exercising at a more intense level. Be aware of warning signs of low blood sugar, such as feeling shaky, weak, tired, hungry, lightheaded, irritable, anxious or confused.

Drink plenty of water or other fluids while exercising because dehydration can affect blood sugar levels.

Always have a small snack or glucose tablets with you during exercise in case your blood sugar level drops too low. Wear a medical identification bracelet.

If you take insulin, you may need to reduce your insulin dose before exercising and monitor your blood sugar closely for several hours after intense activity as sometimes delayed hypoglycemia can occur.

You may also need to adjust treatment if you've increased your exercise routine.

Insulin and other diabetes medications are designed to lower your blood sugar levels when diet and exercise alone aren't sufficient for managing diabetes. But the effectiveness of these medications depends on the timing and size of the dose. Medications you take for conditions other than diabetes also can affect your blood sugar levels.

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Original Article

Diagnostic Accuracy of Red Cell Distribution Width in Iron Deficiency Anemia, Taking Serum Ferritin as Gold Standard among Pregnant Pakistani Women

Tayyeba Rehman, Nosheen Maqsood, Saba Iqbal, Rabia Afzal, Sehar Fatima and Kashifa Bibi

ABSTRACT

Objective: To find the diagnostic accuracy of red cell distribution width in iron deficiency anemia, taking serum ferritin as gold standard among pregnant Pakistani women.

Study Design: A descriptive cross-sectional study

Place and Duration of Study: This study was conducted at the Department of Obstetrics & Gynaecology, Allied Hospital, Faisalabad from April to October 2021.

Methods: A descriptive cross-sectional validation study was carried out at Department of Obstetrics & Gynaecology, Allied Hospital, Faisalabad to determine the diagnostic accuracy of RDW in IDA, taking serum ferritin as gold standard.

Results: In 115 RDW positive patients, 100 (True Positive) had iron deficiency anemia and 12 (False Positive) had no iron deficiency anemia on serum ferritin levels. Among, 88 RDW negative patients, 15 (False Negative) had iron deficiency anemia on serum ferritin levels whereas 73 (True Negative) had no iron deficiency anemia on serum ferritin levels. Overall sensitivity, specificity, positive predictive value, negative predictive value and diagnostic accuracy of red cell distribution width in iron deficiency anemia, taking serum ferritin as gold standard was 86.96%, 85.88%, 89.29% 82.95% and 86.50% respectively.

Conclusion: This study concluded that diagnostic accuracy of RDW in diagnosing IDA in pregnant women is very low.

Key Words: Pregnant, Women, RDW, IDA, Accuracy

Citation of article: Rehman T, Maqsood N, Iqbal S, Afzal R, Fatima S, Bibi K. Diagnostic Accuracy of Red Cell Distribution Width in Iron Deficiency Anemia, Taking Serum Ferritin as Gold Standard among Pregnant Pakistani Women. Med Forum 2024;35(2):3-6. doi:10.60110/medforum.350201.

INTRODUCTION

Red cell distribution width (RDW) is a hematological parameter that reflects the variability in the size of circulating red blood cells. While traditionally used as a marker for various hematological disorders, recent studies have suggested its potential role in the diagnosis of IDA. The diagnostic accuracy of RDW, particularly in comparison to the widely accepted serum ferritin levels, which serve as the gold standard for assessing iron stores, is an area of growing interest in the context of pregnant Pakistani women [1].

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Received: October, 2023
Accepted: December, 2023
Printed: February, 2024

Pregnant women in Pakistan face unique challenges, including nutritional deficiencies and limited access to healthcare, making the accurate diagnosis of IDA crucial for appropriate intervention. Establishing RDW as a reliable diagnostic marker for IDA, with serum ferritin as the gold standard, holds promise for enhancing the efficiency of screening programs and improving the overall maternal and fetal health outcomes in this population. One of the most frequent illnesses affecting pregnancy is anemia[2]. The incidence and causes of anemia during pregnancy vary depending on the geographic region. In underdeveloped nations, anemia is a serious health issue that particularly affects women and is linked to high rates of mortality and morbidity in mothers, as well as low birth weight in babies [3]. In Africa, anemia accounts for 20% of maternal deaths (Abioye et al., 2016). Anemia has a higher prevalence in developing countries, ranging from 35-75%, than in developed nations, where it accounts for only 19%[4]. However, there is a need for local data to aid in the development of preventive programs because anemia prevalence varies greatly within and between nations. Anemia is one of the most prevalent nutritional deficiencies globally. According to

the World Health Organization (WHO), iron deficiency anemia (IDA) is accompanied by low iron reserves and indications of iron-corrupted supply to tissues[5].

In developing nations, low nutritional intake and blood loss from worm infestation are the main causes of IDA, whereas in developed countries, a vegetarian diet, chronic blood loss, or malabsorption are the main causes[6]. Pregnancy-related anemia is a severe health concern in Pakistan, where it can occur up to 38% of the time in the final trimester. There is a significant risk of adverse maternal and fetal outcomes[7]. Early prenatal iron deficiency identification is beneficial for both the mother and unborn baby. Because of the major physiological alterations during pregnancy, some hematological parameters, such as mean corpuscular hemoglobin (MCH), mean corpuscular volume (MCV), and mean corpuscular hemoglobin concentration (MCHC), are not useful markers for detecting anemia/IDA because they are lowered only when anemia is serious or well-developed[8].

Diagnostic tests for iron deficiency include mean corpuscular volume (MCV), hemoglobin concentration (Hb), mean corpuscular hemoglobin (MCH), red cell distribution width (RDW), zinc protoporphyrin, serum transferrin receptor (Tfr), bone marrow biopsy, and serum ferritin [9]. Serum iron, serum ferritin, and its percentage saturation decrease during pregnancy, whereas total iron binding capacity increases. Despite being the preferred method for diagnosing IDA, serum ferritin is costly and complicated, and because it is an acute phase reactant, it might cause misunderstanding due to spurious increases. The complete blood count (CBC) also includes the test of red cell distribution width (RDW), a relatively recent and common parameter that is performed in a fully automated hematology analyzer[9]. Early RBC alterations associated with IDA can be detected using RDW. As a result, the CBC can be utilized as a fast and affordable cost test to identify IDA using the RDW. In different groups of red cell size, RDW displays minute variances and changes. There aren't many published studies that focus on the performance of RDW in identifying IDA during pregnancy. The diagnostic efficacy of RDW in identifying IDA in pregnant women has been the subject of debate in previous investigations[10].

METHODS

A cross-sectional validation study was carried out at the Department of Obstetrics & Gynaecology, Allied Hospital, Faisalabad from April to October 2021 to assess RDW's efficacy in IDA diagnosis in situations where serum ferritin was the gold standard.

Sample size of 200 cases was calculated with 95% confidence level (CI), taking expected prevalence of IDA in pregnant women as 59.47%, 10% desired precision for sensitivity of 82.30%, and specificity 97.40% of RDW in predicting IDA in pregnant women (Ahmad et al., 2016).

Inclusion and exclusion criteria

- All pregnant women with anemia (as per operational definition) with a gestational age of >12 weeks as assessed on LMP between the ages of 18-40 years having Hb <10 g/dl, being both primiparous and multiparous, were selected for this study.
- Subjects whose medical records included a history of steroids or iron supplements and those with asthma or chronic renal failure were excluded from this study.

Data collection: After obtaining informed consent, 5 ml of blood was aseptically drawn from the antecubital vein in an ethylene diamine tetra acetic acid (EDTA) vial, and an automated hematology analyzer was used to analyze RDW immediately. The same sample was used to assess serum ferritin levels. A specialist hematologist reviewed the findings. For iron deficiency a serum ferritin value of <15ng/ml was taken as positive for IDA and RDW >15.9% was taken positive for IDA.

Statistical Analysis: The collected data were analyzed using SPSS 25.0. Mean and SD are presented for age, gestational age, parity, and BMI. Sensitivity, specificity, positive predictive value, negative predictive value, and diagnostic accuracy were calculated using the following formula:

IDA on RDW		IDA on serum ferritin	
		Yes	No
	Yes	True Positive (a)	False Positive (b)
	No	False Negative (c)	True negative (d)

Sensitivity: a / a+c x 100
Specificity: d / b+d x 100
Positive predictive value: a / a+b x 100
Negative predictive value: d / c+d x 100
Diagnostic accuracy: a+d / a+b+c+d x 100

RESULTS

During the study period, 200 pregnant women who fulfilled the study criteria were enrolled. Characteristics of these subjects are shown in table 1.

Table No. 1: Basic characteristics of the pregnant women included in the study at Allied Hospital, Fsd.

Patients' characteristics	Mean SD
Age, years	28.82 ± 5.17
Gestational age, weeks	20.64 ± 4.75
Parity	2.70 ± 1.21
BMI (kg/m2)	28.71 ± 3.96

The age range in this study was 18-40 years with a mean age of 28.82 ± 5.17 years. The mean gestational age was 20.64 ± 4.75 weeks. The mean parity was 2.70

± 1.21. Mean BMI was 28.71 ± 3.96 kg/m2. In 115 RDW-positive patients, 100 (True Positive) had iron deficiency anemia and 12 (False Positive) had no iron deficiency anemia on serum ferritin levels.

Among, 88 RDW negative patients, 15 (False Negative) had iron deficiency anemia on serum ferritin levels whereas 73 (True Negative) had no iron deficiency anemia on serum ferritin levels as shown in Table 2.

Table No. 2: Diagnostic accuracy of red cell distribution width in iron deficiency anemia, taking serum ferritin as gold standard.

	Total	Positive result on serum ferritin	Negative result on serum ferritin	P-value
Positive on RDW	115	100 (TP)*	12 (FP)***	0.0001
Negative on RDW	88	15 (FN)**	73 (TN)****	

The overall sensitivity, specificity, positive predictive value, negative predictive value, and diagnostic accuracy of red cell distribution width in iron deficiency anemia using serum ferritin as the gold standard were 86.96%, 85.88%, 89.29% 82.95%, and 86.50%, respectively (Table 3).

Table No. 3: Performance of RDW in the diagnosis of IDA among pregnant women

Validity test	Percentage
Sensitivity	86.96%
Specificity	85.88%
Positive Predictive Value	89.29%
Negative Predictive Value	82.95%
Diagnostic Accuracy	86.50%

DISCUSSION

Hemoglobin is the most widely used hematological measure and IDA screening test. However, hemoglobin is limited in its ability to identify IDA because a sufficient period is required for iron to cause an impact[11]. In addition, it can take up to 2 months for low levels of hemoglobin to appear. According to a recent study, during pregnancy, other hematological indicators such as MCV, MCH, and MCHC, which can be measured using a hemoanalyzer, do not adequately identify IDA[12]. It is suspected that these red blood cell indices (MCV, MCH, and MCHC) may be mean values that are incapable of adequately representing the minute variation in red cell size that characterizes early iron deficiency. Hence, there is a need for a screening test that is affordable and can accurately and reliably detect iron deficiency[13]. Therefore, using serum ferritin as the gold standard, this study aimed to evaluate the diagnostic precision of RDW in IDA.

Using serum ferritin as the gold standard, the sensitivity, specificity, positive predictive value, negative predictive value, and diagnostic accuracy of RDW in detecting IDA were 86.96%, 85.88%, 89.29% 82.95%, and 86.50%, respectively. In the reference research, it was discovered that pregnant women had iron deficiency anemia at a rate of 59.47%, and RDW with a cut-off value of >15.9% had a sensitivity of 82.30% and specificity of 97.40% for identifying IDA[14]. Because our study's sensitivity and specificity did not match those of the reference publication[15], our findings were unable to assess the RDW diagnostic accuracy. In a Pakistani study, RDW demonstrated a sensitivity and specificity of 77.0% and 72.0%, respectively[16]. In another local study, RDA revealed a high sensitivity and specificity of 93.33% and 83.33%, respectively[17]. There have been reports of different RDW values in different studies. For instance, Aulakh et al. discovered that RDW had a sensitivity of 81.0% and a specificity of 53.4%, whereas van Zeben et al. discovered that RDW had a sensitivity of 94% and a specificity of 59%..

CONCLUSION

This study concluded that the diagnostic accuracy of red cell distribution width in diagnosing iron deficiency anemia in pregnant women is very low.

Author's Contribution:

Concept & Design of Study:	Tayyeba Rehman
Drafting:	Nosheen Maqsood, Saba Iqbal
Data Analysis:	Rabia Afzal, Sehar Fatima, Kashifa Bibi
Revisiting Critically:	Tayyeba Rehman, Nosheen Maqsood
Final Approval of version:	Tayyeba Rehman

Conflict of Interest: The study has no conflict of interest to declare by any author.

Source of Funding: None
Ethical Approval: No.48-ERC/2020-21/PHRC/FMU/73 dated 20.02.2021

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Original Article

To Evaluate the Stability and Functional Outcome in ACL Reconstruction by Semitendenosis Graft in Low-Demanding Patients

Syed Ali Raza[1], Haseeb Saqlain Bajwa[2], Muhammad Kamran[1], Muhammad Kashaf Naseer[1], Naveed Ali Shair[2] and Amir Sohail[3]

ABSTRACT

Objective: This study aimed to evaluate the stability and functional outcomes of ACL reconstruction using the semitendinosus graft.

Study Design: This was a prospective cohort study.

Place and Duration of Study: This study was conducted at the Mayo Hospital OPD in Lahore between April 2022 and April 2023.

Methods: A total of 15 patients with confirmed ACL ruptures, diagnosed clinically and through MRI, were recruited from the Mayo Hospital OPD in Lahore between April 2022 and April 2023. All surgeries were performed under a tourniquet, and the semitendinosus graft was used as the graft material. Functional outcomes were assessed using the Lysholm knee score.

Results: Among the 15 patients, 10 (66.66%) had twisting injuries, 3 (20%) were involved in car accidents, and 2 (20%) had previously experienced falls. Three patients (20%) exhibited positive grade I Lachman test results at the final follow-up, while 12 (80%) showed good outcomes with negative Lachman test results. The mean satisfaction rate was 7.1 ± 0.6 at three months and increased to 9.1 ± 0.1 at six months post-surgery. Before treatment, 6 (40%) patients had stability grade 3, and 9 (60%) had stability grade 2. The average Lysholm knee score before surgery was 66.1 ± 5.6; after surgery, it improved significantly to 92.3 ± 4.3. A paired t-test demonstrated a substantial improvement in the Lysholm knee score following surgery (p-value < 0.001).

Conclusion: In conclusion, using the semitendinosus graft in ACL reconstruction resulted in excellent outcomes, including improved stability, minimal intraoperative trauma, and high patient satisfaction.

Key Words: ACL, Lysholm Knee Score, semitendinosus graft

Citation of article: Raza SA, Bajwa HS, Kamran M, Naseer MK, Shair NA, Sohail A. To Evaluate the Stability and Functional Outcome in ACL Reconstruction by Semitendenosis Graft in Low-Demanding Patients. Med Forum 2024;35(2):7-10. doi:10.60110/medforum.350202.

INTRODUCTION

The anterior cruciate ligament (ACL) is a vital stabilizer of the knee joint but is susceptible to injury, commonly occurring during activities like jumping and sports. Such injuries often force individuals to discontinue sports and physically demanding jobs. Research conducted by Del Bel has identified sports as a significant contributor to ACL injuries, with a greater impact on younger individuals than their older counterparts[1]. ACL injuries can also lead to meniscus damage, potentially resulting in osteoarthritis over time. In the United States, ACL injuries have a prevalence of approximately 1 in 3000 people, with roughly 120,000 cases reported annually[2]. Males are more commonly affected than females. The surgical procedure known as ACL Reconstruction is often necessary to restore knee stability. If left untreated, patients experience instability, difficulty traversing uneven terrain, and challenges with running and jumping, significantly affecting their quality of life.

Over time, various surgical techniques have been developed, ranging from repair to reconstruction and open procedures to arthroscopic rebuilding[3]. Successful graft placement is essential for achieving improved functional outcomes. The prevailing

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Received: October, 2023
Accepted: December, 2023
Printed: February, 2024

technique for reconstruction involves a single bundle, typically restoring 60 to 70% of knee function[4].

Multiple graft options are available, with the commonly employed Bone Patellar Tendon Bone (BPTB)[5]. Among hamstring grafts, the tendons of the Gracilis and Semitendinosus muscles are frequently used[6]. The quadruple hamstring graft has demonstrated notable advancements in ACL reconstruction outcomes due to its superior tensile strength, nearly three times that of the native ACL[7]. Moreover, it is associated with fewer complications compared to alternative graft choices.

While ACL reconstruction has made significant strides, it remains an evolving field to address complications and enhance surgical outcomes[8]. Thoughtful graft selection, precise tunnel placement, and carefully designed early rehabilitation programs can help minimize common surgical complications[9].

This study's primary objective is to provide evidence-based insights that substantiate claims in the existing literature, eliminating conjectural statements often rooted in clinical or surgical experiences. The study's findings will facilitate informed decision-making when selecting appropriate surgical procedures for ACL injuries.

METHODS

From April 2022 to April 2023, a comprehensive study was conducted within the Department of Orthopedic Surgery at Mayo Hospital in Lahore, Pakistan. The study aimed to investigate the outcomes of surgical procedures for patients with ACL injuries.

Study Type: This was a prospective cohort study.

Study Setting: The study was conducted at Mayo Hospital in Lahore, Pakistan, within the Department of Orthopaedic Surgery.

Sampling Method: A purposive, non-probability sampling strategy was employed to select participants.

Inclusion Criteria: Patients of any gender between the ages of 18 and 40 years with a clinically confirmed complete ipsilateral ACL tear, as verified by MRI, were included in the study.

Exclusion Criteria: Patients with preexisting osteoarthritis, neuropathy, myopathy, multiple ligamentous injuries, a history of prior ACL reconstruction, or active infections.

Data Collection: Demographic data such as age, gender, height, and weight of the patients was recorded. Details about the circumstances of the injury, the mechanism of knee involvement, and any associated injuries were documented. Before surgery, patients underwent a thorough preoperative evaluation. This included assessing a range of motion, using the Lachman and Pivot Shift tests, and evaluating lateral and medial collateral ligament injuries in both surgical and non-operative knees.

Surgical Procedure: Patients were admitted to the hospital one day before surgery and made anesthesia-ready after obtaining informed consent. The semitendinosus tendon was identified and marked while the patient was supine. A tourniquet was applied, and the knee and leg were prepared for surgery. The semitendinosus tendon was harvested at the tendo-muscular junction and then transferred to the medial surface of the tibia for insertion. The knee joint was accessed, fat was removed, and tunnel sections were defined. The femoral tunnel was created with the knee at 90 degrees of flexion, and the tibial tunnel was positioned at the center of the ACL insertion. After removing soft tissue, the graft was secured at the lateral epicondyle locations using a suture passer, and the proximal tibia was drawn anteriorly. A femur or tibia condyle bone graft was placed into each tunnel.

Testing: The Lachman test assessed tibia translation on the femur after graft fixation. Following aseptic procedures, the surgical wound was closed. Patients' knees were immobilized in extension using knee immobilizers. They were gradually transitioned to weight-bearing and discharged the next day. A structured rehabilitation program was followed by patients for six months post-surgery. Patients were monitored in the Ortho OPD at 2, 4, 10, 18, and 24 weeks post-surgery.

Stability and Lysholm knee ratings were recorded both before and after surgery.

Data Analysis: Paired t-tests were conducted to determine the significance of variance before and after the procedure. Data analysis was performed using SPSS software version 26, and statistical significance was considered for p-values less than 0.05.

RESULTS

Of the fifteen patients, eleven (73.33%) were men and four (26.66%) were women (Figure 1).

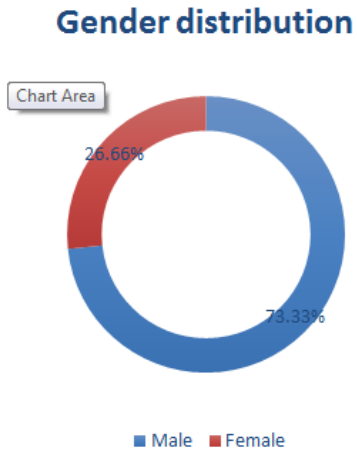

Figure No. 1: Gender distribution in the study population:

The patients' mean age group was 26.7 + 5.8.10, meaning that 66.66 percent of the patients had twisting

injuries, 20% had driving accidents, and 13.33 percent had a history of falls. A 15-week return to work was the average (Figure 2). Before therapy, nine patients (60 percent) had stability (LACHMAN TEST grade 3), and six patients (40 percent) had stability (grade 2). Three patients (20%) had grade-1 positive results after treatment, and twelve (80%) had negative results (Table

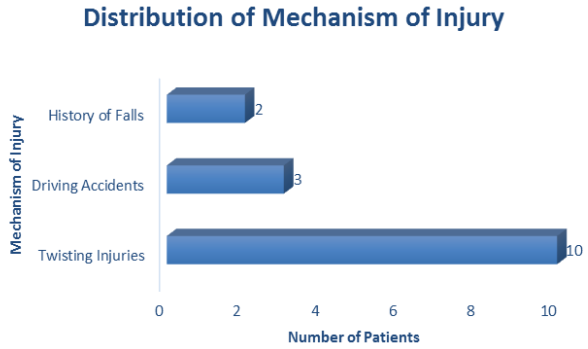

Figure No. 2: Distribution of mechanism of injury in the study population:

Table No. 1: Stability score:

Treatment	Stability score				Total
	Score 0	Score 1	Score 2	Score3	
Before	0 0.0%	0 0.0%	9 60%	6 40%	15 100%
After	12 80%	3 20%	0 0.0%	0 0.0%	15 100%

The Lysholm score was computed both before and following the procedure. Before surgery, the average Lysholm knee score was 66.1 ± 5.6. Six months following surgery, the average Lysholm knee score was 92.3 ± 4.3. A paired t-test was employed to find the mean difference between the pre-and post-operative times. The outcomes demonstrated a p-value < 0.001 substantial improvement in the Lysholm knee score following surgery (Table 2).

Table No. 2: Difference between LKSS before and after surgery

Lysholm Knee Score	Mean	SD	p-value
Before Surgery	66.1	5.6	<0.001
After Surgery	92.3	4.3	

Utilizing a performance concerning knee function both before and after surgery, the patient satisfaction rate was also determined. Three and six months following surgery, the findings were evaluated. The information demonstrates that following surgery, the patient satisfaction rating significantly improved (Table 3).

Table 3: Patient satisfaction at three and six months:

Patient Satisfaction Rate	Mean	SD	Mini-mum	Maxi-mum
At 3 months	7.1	0.59	6	8
At 6 months	9.1	0.10	8	10

DISCUSSION

An anterior cruciate ligament (ACL) injury is a common ligamentous injury in the knee joint. It is often associated with sports participation and traffic accidents, leading to symptoms of knee instability during activities such as walking on uneven surfaces or sports involvement[10-12].

A study conducted by Majewski et al. over ten years highlighted that ACL injuries are the most prevalent knee joint injuries[13]. Their research showed a higher incidence rate in males (68.1%) aged 22 to 29.

In our study, which included 11 men (73.33%) and 4 women (26.66%), we aimed to investigate the outcomes of ACL injury treatment[14, 15]. Reconstruction of an acute ACL injury is recommended by Buda et al. Based on a seven-year follow-up of fifty patients treated for ACL injuries, their research suggested that surgical intervention yielded better functional outcomes than conservative management[16]. This supports the idea that ACL reconstruction is necessary for restoring knee stability.

Our study involved thirty-five participants who completed a six-month follow-up. The mean age of the patients was 26.7 ± 5.8 years. Among them, 10 (66.66%) had twisting injuries, 3 (20%) were in auto accidents, and 2 (13.33%) had a history of falls.

According to Syed Danish Ali et al., half of their patients achieved an excellent functional outcome when utilizing the Bone Patellar Tendon Bone (BPTB) graft for ACL reconstruction[17]. In contrast, the other half had a fair functional outcome. Six months post-surgery, the average Lysholm knee score significantly improved to 92.3 ± 4.3, indicating remarkable progress in knee function.

Our investigation also assessed patient satisfaction regarding knee function before and after surgery. Evaluations were conducted at three and six months post-surgery. After three months, the mean satisfaction rate was 7.1 ± 0.6, which increased to 9.1 ± 0.1 after six months. These findings demonstrate a substantial improvement in patient satisfaction following surgery.

We assessed knee joint stability immediately after surgery using the Lachman test, classifying it as Grade 1 with 3-5 mm translation, Grade 2 with 5–10 mm translation, and Grade 3 with greater than 10 mm translation. Our results showed that 3 (20%) patients had grade-1 positive Lachman test results, while 12 (80%) had negative results.

It's important to acknowledge the limitations of this study, including its small sample size and the inclusion of low-demanding patients, which may limit the generalizability of the results to a larger and more active population. Additionally, our study focused on short-term outcomes up to six months post-surgery. Long-term follow-up may be necessary to fully assess

stability and functional outcomes in ACL reconstruction using the semitendinosus graft.

CONCLUSION

We have determined that using a semitendinosus graft produces outstanding outcomes regarding stability and patient contentment. Furthermore, this procedure causes minimal harm to the patient, allowing for early mobilization and a prompt return to work. Therefore, it is recommended as the primary choice for the surgeon and the patient regarding ACL reconstruction.

Author's Contribution:

Concept & Design of Study:	Syed Ali Raza
Drafting:	Haseeb Saqlain Bajwa, Muhammad Kamran
Data Analysis:	Muhammad Kashaf Naseer, Naveed Ali Shair, Amir Sohail
Revisiting Critically:	Syed Ali Raza, Haseeb Saqlain Bajwa
Final Approval of version:	Syed Ali Raza

Conflict of Interest: The study has no conflict of interest to declare by any author.

Source of Funding: None
Ethical Approval: No. KEMU/12/2022 dated 10.01.2022

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Original Article

Finite Element Analysis

Follow Up of Short and Standard-Length Dental Implants Retaining Mandibular Kennedy Class I Removable Partial Dentures

Mohamed Ahmed Alkhodary

ABSTRACT

Objective: Short dental implants (6 mm or less) can present a replacement to standard length dental implants (more than 6 mm) in atrophic edentulous ridges with no augmentation procedures. The aim of the current work was to evaluate the clinical performance of short dental implants assisting mandibular free end partial dentures and study the stresses generated around them after 3 years of loading.

Study Design: Controlled clinical trial study

Place and Duration of Study: This study was conducted at the Department of Prosthetic Dental Sciences in the College of Dentistry, Qassim University, KSA, for a period of more than 3 years, starting August 2020 to November 2023.

Methods: The current work represented a prospective observational study which implemented clinical evaluation and stress analysis using finite element analysis of the short implants assisting mandibular free end partial dentures, placed once at the location of the missing first molar, and once at the location in the missing second molar, on the right side of the edentulous ridges with long implants placed on the left sides

Results: The short implants placed at the locations of second molars had more vertical bone loss, less bone density profile, and more stress concentrations than those placed at the locations of the first molars. Similarly, the long implants had the same results, however, their values were better than those of related short implants

Conclusion: After three years of loading, short dental implants were still clinically successful in supporting class I Kennedy mandibular free end partial dentures, with implants placed at the locations of the first molars having better vertical bone loss and stress distribution than those placed at the locations of second molars.

Key Words: Short Dental Implants, Free End RPD, Follow-Up, Finite Element Analysis

Citation of article: Alkhodary MA. Follow Up of Short and Standard-Length Dental Implants Retaining Mandibular Kennedy Class I Removable Partial Dentures. Med Forum 2024;35(2):11-16. doi:10.60110/ medforum.350203.

INTRODUCTION

Short dental implants provided a successful replacement of standard-length dental implants in situations that otherwise needed bone augmentation,[1-3] and have shown clinical success for up to 10 years.[4-6] Finite element stress analysis have also shown success of short implants, whether splinted or not, as compared to standard length implants, inserted with the same insertion torque, and used for support of full arch restorations.[7-14]

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Received: December, 2023
Accepted: January, 2024
Printed: February, 2024

However, claims about the location of the implants, marginal bone loss, rate of failure, stress concentration related to decreased length, and response to axial and oblique loading,[15-24] were the motives to conduct the current study.

METHODS

The current work represented a prospective observational study, where standard length and short dental implants assisting distal extension mandibular class I Kennedy removable partial dentures (Fig. 1A) were evaluated after 3 years of function for plaque index, pocket or probing depth, implant stability using the periotest, and radiographic examination which included determination of the peri-implant vertical bone loss, and bone density profile using standardized digital peri-apical x-rays and stress analysis using finite element analysis.

Originally, before beginning of the study, ethical approval was obtained, which approved the use of one short implant on one side of the arch and a standard-length implant on the contralateral side, and patients signed an informed consent that explained the use of

one short implant under their removable partial dentures. The number of the patients participated in this study was determined using convenience sampling, where the patients were blindly divided into two groups, in group I, ten patients had one short implant (6 mm long and 4 mm width, Astra tech) placed at the approximate site of the missing first molar (Fig. 1B), and one long implant (10 mm long and 4 mm width, Astra tech) placed at the approximate site of the missing first molar, whereas in group II the same number of patients had the same implants distribution, but placed at the approximate site of the missing second molar. (Fig. 1C).

For assessment of the vertical bone loss, the x-ray images were made using a film holding device (SIRONA) for extension cone paralleling technique, and the vertical bone loss was assessed by the linear measurement tool of the SIDEXIS software, attached to the Sirona digital X-ray machine, which measured the span from the surface of the alveolar bone next to the implant up to the implant shoulder. The recorded vertical bone loss readings were statistically analyzed using the paired *t* test. For assessment of the bone density profile, the SIDEXIS software utilized a gray scale of 0-255, where a vertical line was drawn almost contacting the implant mesial and distal sides (Fig. 1D), giving readings of the bone gray scale. The average readings from the mesial and distal sides were recorded and statistically analyzed also using the paired *t* test.

Finite element analysis (FEA) was used for stress analysis around the implants used in this study, where a 3-D FEA model was constructed for the dental implants and investing alveolar bone from cone beam computed tomography (CBCT) scans of every patient, where the para-axial cuts were made to show scans in a buccolingual direction as seen in Figure 2. Then computer software (ANSYS 10) used the CBCT cuts to develop the patient specific 3-D model.

The elastic moduli of each structure composing the three-dimensional digital model were determined (table 1), and the nature of the structures composing the three-dimensional digital model was set to be anisotropic. Finally, the magnitude, direction and the mode of the applied occlusal forces were set to a vertical load of 100 N and an oblique load of 70 N and the resulting color map (von Mises) revealed the magnitude of stresses around each implant.

RESULTS

Comparison of the means of plaque index, probing depth, and mobility revealed no statistically significant differences between the implants within each group and between group I and II as seen in table 2, however, the radiographic evaluation revealed that the mean vertical bone loss (mm) was significantly greater for short implants than that for long implants within each group, and significantly greater for both short and long implants in group II as compared to those in group I. (table 2)

Statistical analysis of the bone density measurement three years after loading revealed that it was significantly lower for short implants than long implants within each group, and significantly lower for long and short implants of group II as compared to those of group I on individual basis and as a whole when all implants of group II were compared to all implants of group I as seen in table 3.

Comparison of the finite element analysis stress distribution revealed no differences between group I and II in the peri-implant bone response under axial loading, however, under oblique loading the von Mises stress distribution results conformed to the radiographic findings, where long implants of group I had the least stress concentration in the surrounding bone with stresses concentrated more on the lingual than the buccal side of the implants (Fig. 3A), followed by long implants of group II (Fig. 3B) which had more stresses on both the lingual and buccal sides on the implants, then, short implants of group I, which had an increasing pattern of surrounding stresses on the lingual and buccal sides of the implants(Fig. 3C), and finally short implants of group II which had the highest stress concentration in its surrounding bone (Fig. 3D), and highest bending in a buccolingual direction of the implant abutment as seen in figure 3E.

Table No.1: Material properties inputs for finite element analysis.

Material	Young's modulus E (MPa)	Poission's ratio
Cortical bone	15000	0.3
Cancellous bone	1500	0.3
Titanium implant	110000	0.35

Table No.2: Descriptive (mean and standard deviation SD) and statistical analysis (p value) of the three years follow-up of the short and long implants

		Group I			Group II			Group I versus Group II (p)		
		Long implants	Short implants		Long implants	Short implants		Long implants	Short implants	All implants
Plaque index	Mean	1.2	1.5	0.07	0.813	1.167	0.08	0.06	0.08	1
	SD	0.404	0.753		0.239	0.408				
Probing depth	Mean	1.7	1.8	0.08	2	2.3	0.06	1	0.07	0.08
	SD	0.522	0.546		0.498	0.425				
Mobility	Mean	-4.3	-3.2	0.06	-4.1	-2.9	0.09	0.07	0.08	0.08

	SD	1.11	1.37		1.45	1.56				
Vertical bone loss	Mean	1.7	1.8	0.07	1.9	2.1	0.06	0.04	0.02	0.03
	SD	0.654	0.524		0.521	0.389				

Table No.3: Descriptive and statistical analysis (p value) of bone density profile within each group and between groups after 3 years of loading

	Group I			Group II			Group I versus group II		
	Long implants	Short implants	p	Long implants	Short implants	p	Long implants	Short implants	All implants
Range	237-238	190-234	0.03	198-235	155-199	0.01	0.04	0.01	0.02
Mean	235.2	210.5		215.2	172				
Standard deviation	232.1	227.5		228.4	189.3				
Median	235	220		228	172				

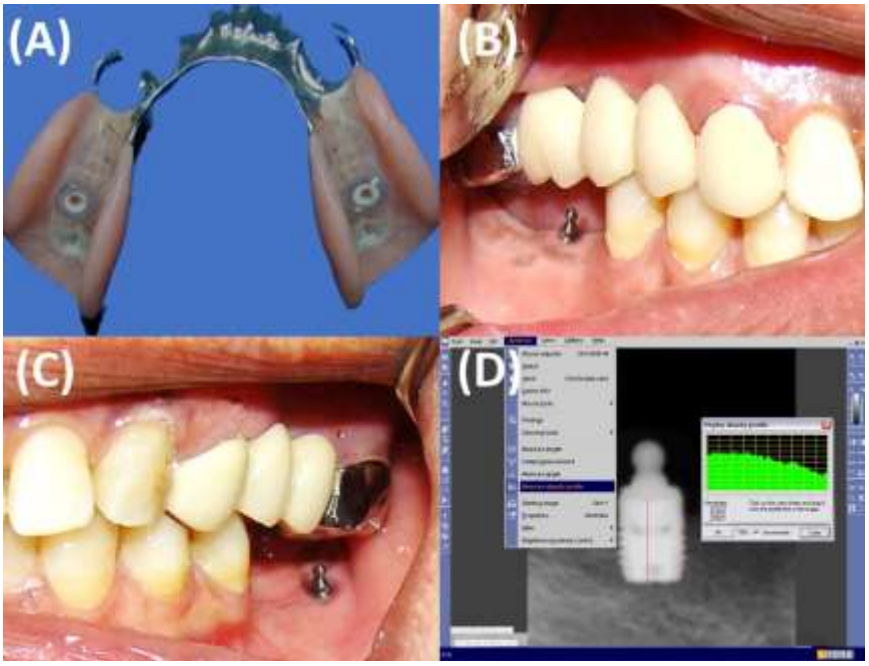

Figure No.1: A, intaglio surface of the RPD. B, Short dental implant placed at the location of the first molar in one of group I cases. C, long dental implant placed at the location of the second molar in one of group II cases. D, Measuring the bone density profile.

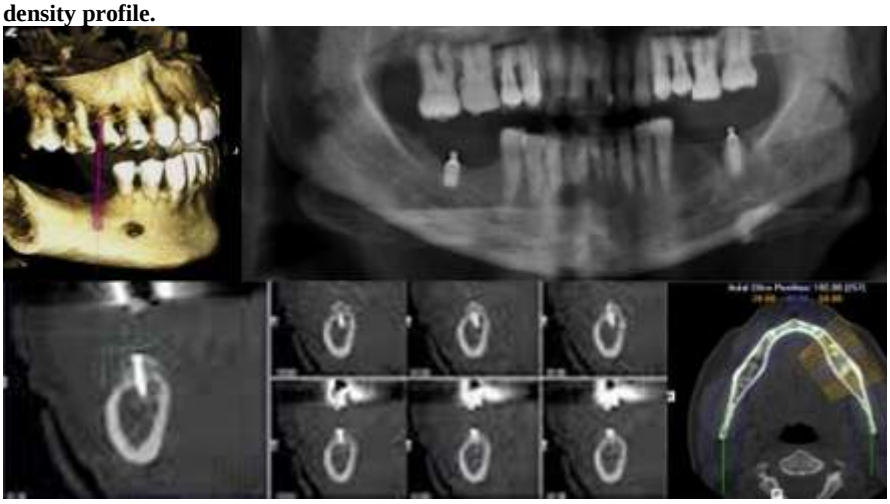

Figure No.2: Cone beam computed tomography (CBCT) showing the reconstructed three-dimensional model of one of the patients, the panoramic view, and the para-axial cuts.

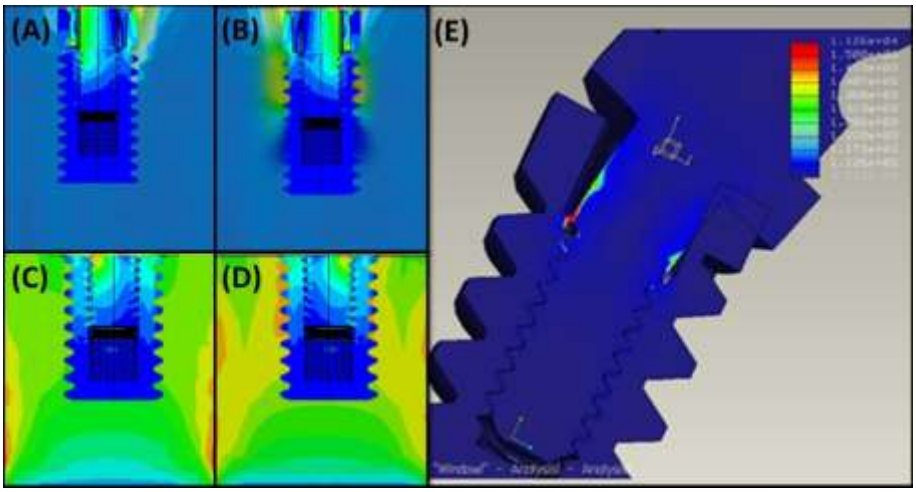

Figure No.3: Stress distribution around implants in group I and II: A. long implants of group I, B. long implants of group II, C. short implants of group I, D. short implants of group II, E. buccolingual flection of group II short implants abutments.

DISCUSSION

When the implants used in this study were followed-up after one year of loading, there was no statistically significant differences between short and long implants in both groups in regards to the plaque index, pocket or probing depth, implant stability, and vertical bone loss. However, the only significant difference was the higher bone density profile for long implants in group I as compared to short implants in the same group, and the higher bone density profile for implants in group I as compared to group II implants.[5] After three years of loading, there was no statistically significant differences between short and long implants in both groups in regards to the plaque index, pocket or probing depth, implant stability, however, both vertical bone loss and bone density profile had better values for group I implants. This came in contrast to the findings of Sun et al[17] and Lemos et al[18] who reported that short implants had marginal bone loss similar to standard length implants, and in accordance with Li et al[10] who concluded that short implants do not present superior performance as compared to conventional long implants.

In contrast to Hegazy et al[21] who suggested distal rather than mesial placement of the implants, the findings of this study suggested more favorable stress distribution around short and long implants placed in the first molar region compared to those placed in the second molar region, which could be subjected to the more buccolingual movement of the removable partial denture free end. Also as concluded by Qin S, Gao[7] that non-splinted short implants placed more distal regions can be subjected to more stresses as the implant length decreased.

In regards to splinting, Zupancic et al[23] suggested splinted over non-splinted short implants. Also, Talreja et al[11] suggested splinting of short implants provided better resistance to oblique loading conditions. However, this could be true for short implants supporting fixed prostheses, but for short implants under removable prostheses, it is possible that bilateral occlusal loading could minimize the oblique forces, that were also shared by the composite support obtained from the occlusal rests and the free end residual ridges as explained by Shahmiri et al.[20]

The finite element stress analysis in this study found more stress concentration around short implants, specifically in group II at the end of the edentulous ridges, a finding that came in agreement with Araki et al,[22] and Yang et al[24] who emphasized the effect of oblique loading on the generation of such stresses. These findings could give the impression that short implants have higher rates of failure in clinical service in 1 to 5 years as suggested by Papaspyridakos et al,[19] however, the short implants in this study did not show any signs of failure, and are to be followed up for further periods, a situation similar to the findings of Anitua and Alkhraisat[9] who followed up forty-one short implants for 3, 6, and 15 years.

In conclusion, the current work reported less vertical bone loss and better stress distribution around short implants placed at the sites of first molars rather than second molars under free end removable partial dentures, however, the limitations of this study might have effects on the results in case of duplication of the same clinical trial, these limitations might include the use of one of the followings: 1) a larger sample size, 2) implants with different diameter sizes or thread designs, 3) a different super-structure attachment other than ball abutments, such as locators or magnets, 4) a different occlusal scheme for the prostheses such as lingualized cusp occlusion to minimize lateral stresses, and finally, 5) a longer follow-up durations.

CONCLUSION

After three years of loading, short dental implants were still clinically successful in supporting class I Kennedy mandibular free end partial dentures, with implants placed at the locations of the first molars having better vertical bone loss and stress distribution than those placed at the locations of second molars.

Author's Contribution:

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Conflict of Interest: The study has no conflict of interest to declare by any author.

Source of Funding: None

Ethical Approval: No. M-2020-3008 dated 01.08.2020

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Original Article

Potential Teaching Skills Needed as a Clinical Teacher for Teaching Medical Sciences: A Cross-Sectional Study

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ABSTRACT

Objective: The purpose of this study is to identify the teaching skills required for clinical teachers in the field of medical sciences.

Study Design: Cross sectional study.

Place and Duration of Study: This study was conducted at the Fazaia Ruth Pfau Medical College, Karachi from June 2022 to November 2022.

Methods: The questionnaire used in the study for data collection from all participants was a predesigned self-administered survey form developed from Literature. It has a list of 17 potential teaching factors/ skills (1= may not have and 5= must have according to literature that was valued the most in a clinical teacher. They included evidence-based teaching, creativity in teaching methodology, teaching based on student needs, community-based education, enforcing equal opportunity, helping students to focus on key issues, encouraging evidence to a critique, encouraging an open & trusting environment, encouraging & appreciate diversity, encourage creative work, CME/CPD for teaching skill, leadership skill, commitment to work, provides positive feedback, appreciation for research and encourage critical thinking. Definitions were provided with each skill for better understanding.

Results: A total of 104 clinical faculty members of FRPMC completed the questionnaire. Among the seventeen potential teaching factors/skills, effective Communication Skills, enforcing equal Opportunity and commitment to work obtained a mean score exceeding 4 out of 5. Based on the survey results, the teaching skills that received a mean score between 3.5 to 3.9 are evidence-based teaching, creativity in teaching methodology, community-based education, helping students to focus on key issues, encouraging an open and trustworthy environment, appreciating diversity, encouraging creative work, providing CME/CPD for teaching skills and leadership skills, providing positive feedback, appreciation for research, and encouraging critical thinking. Teaching based on student needs and encouraging evidence for critique has a mean score of below 3.5.

Conclusion: The study helped us to identify key skills required by clinical faculty. The clinical faculty highlighted effective Communication Skills, enforcing equal Opportunity, and commitment to work as the most important skills among the seventeen potential teaching factors/skills.

Key Words: Clinical, communication, faculty, Skills.

Citation of article: Shaikh A, Kirmani F, Aftab R, Zeb A, Ali A, Kumar R. Potential Teaching Skills Needed as a Clinical Teacher for Teaching Medical Sciences: A Cross-Sectional Study. Med Forum 2024;35(2):17-21. doi:10.60110/medforum.350204.

INTRODUCTION

In the changing world of medical education, the responsibilities of a clinical teacher go well beyond just sharing knowledge with their students. They involve a multifaceted approach that connects theoretical understanding with real-world application in the field of medical sciences [1]. As the healthcare field is constantly evolving and medical education transitions towards competency-based education, there is an increasing need for clinical teachers with a wide range of teaching skills specifically designed to meet the requirements of medical students [2].

The process of instructing and guiding students in their learning process is called teaching. It is a crucial aspect of a curriculum and one of the primary responsibilities of clinical educators in a medical institution [3]. Teachers of any institute have a pivotal role in transferring the skills to their students. Therefore, to impart the required competencies to medical graduates, clinical teachers must also be equipped with the essential teaching competencies [4].

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Received: October, 2023
Accepted: December, 2023
Printed: February, 2024

Due to the unique doctor-patient relationship, emphasis on patient safety, and experiential learning, the clinical education curriculum differs significantly from other professions and therefore requires a distinctive teaching approach in clinical settings. Modern-day clinical teaching requires a skill set encompassing communication, leadership, critical thinking, creativity, problem-solving, meta-cognition, evidence-based practice, social responsibility, and technological literacy [5]. The clinical teacher must also maintain a professional attitude to their teaching by continuously evaluating their teaching progress and staying up to date. As per the existing literature, the clinical teacher needs to possess several skills in addition to the ones mentioned above. These skills include the ability to adjust to innovative ideas, collaborate effectively with colleagues, manage time efficiently, make moral decisions based on research and evidence, provide timely feedback, and deliver the most compassionate, ethical, and culturally sensitive care possible [6].

To impart essential clinical teaching skills to teachers of medical sciences, a targeted faculty development program is necessary. Faculty members who receive targeted training are given how they can successfully transfer essential clinical skills and instruct medical students. Furthermore, it ensures that the next generation of healthcare professionals are clinically competent, culturally aware, and compassionate [7]. Medical institutions may establish a learning environment that develops well-rounded and patient-centered healthcare practitioners by investing in faculty training that focuses on these crucial clinical teaching abilities, ultimately raising the standard of patient care.

This study aims to identify the necessary teaching skills for clinical teachers to teach medical sciences, using a literature-based questionnaire. The study results will aid in the development of a targeted faculty development program for the clinical faculty of Fazaia Ruth Pfau Medical College in Karachi. This institution is newly established and moving towards the clinical years of undergraduate medical education. So, the faculty development program which will target the essential clinical teaching skills will eventually help to impart the essential clinical competencies to undergraduate medical students of this institute.

METHODS

For this research study, we adopted a cross-sectional study design. The study was conducted at Fazaia Ruth Pfau Medical College, Karachi, Pakistan. The period for the study was 5 months from June 2022 to November 2022. The study population was clinical faculty working at FRPMC. The study participants included only those clinical faculty members who provided written consent.

The questionnaire used in the study for data collection from all participants was a predesigned self-administered survey form developed from Literature. It has a list of 17 potential teaching factors/ skills (1= may not have and 5= must have according to literature that was valued the most in a clinical teacher. They included evidence-based teaching, creativity in teaching methodology, teaching based on student needs, community-based education, enforcing equal opportunity, helping students to focus on key issues, encouraging evidence to a critique, encouraging an open & trusting environment, encouraging & appreciate diversity, encourage creative work, CME/CPD for teaching skill, leadership skill, commitment to work, provides positive feedback, appreciation for research and encourage critical thinking. Definitions were provided with each skill for better understanding. Two medical educationists validated this questionnaire. Before data collection, permission was taken from the IRB of Fazaia Ruth Pfau Medical College. For the data collection, the questionnaire was sent via email to the entire clinical faculty. Voluntary participation was encouraged. To maintain a code of conduct, the data was kept anonymous and confidential.

Data was analyzed using SPSS version 22. Descriptive analyses were computed for the designation of the clinical faculty in terms of frequency. The potential factors/skills were analyzed by mean and standard deviation.

RESULTS

A total of 104 clinical faculty completed the survey. The response rate was 104/ 125 (83%). The designation of the faculty members is shown in figure 1. Table 1 displayed the results of the seventeen survey items to determine faculty perception.

Table No.1: Descriptive Statistics

Item	Mean	Std. Deviation
Effective Communication Skills	4.16	1.247
Evidence-based teaching	3.86	1.194
Creativity in Teaching Methodology	3.60	.981
Teaching based on student Needs	3.47	1.149
Community-Based Education	3.51	1.115
Enforce Equal Opportunity	4.38	1.135
Help Students to focus on key issues	3.95	1.097
Encourage evidence to a critique	3.36	1.033
Encourage an open and trustworthy environment	3.84	1.263
Encourage and appreciate diversity	3.66	1.030
Encourage Creative work	3.55	1.060
CME/CPD for teaching skill	3.82	1.172

Leadership Skill	3.65	1.121
Commitment to work	4.08	1.172
Provides Positive Feedback	3.73	1.168
Appreciation for research	3.71	1.112
Encourage Critical Thinking	3.72	1.210

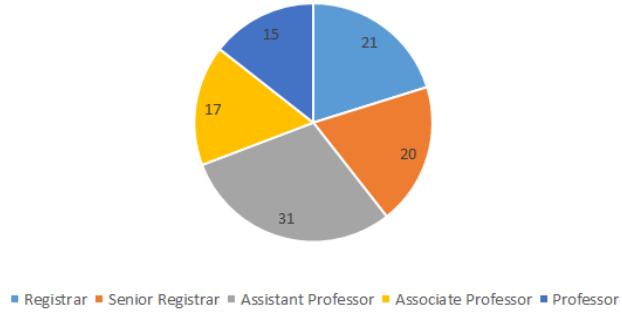

Figure No. 1: Designation of clinical faculty at FRPMC

DISCUSSION

The main goal of medical education is to produce competent graduates who have the necessary knowledge, skills, and attitudes. Clinical education plays a crucial role in fulfilling this important objective, as a substantial portion of the medical education curriculum is focused on it [8]. Conversely, teaching and learning in clinical settings form the core of medical education. Ensuring high-quality patient care and student learning in clinical education depends on effective clinical teaching [9]. To accomplish this, two fundamental principles must be acknowledged: the need for specific skills and procedures identified through research, and the importance of adapting teaching to specific contexts [10].

The objective of this study was to identify the teaching skills required for clinical teachers in the field of medical sciences. A questionnaire was created based on existing literature to gather data on these skills. A total of 104 clinical faculty members of FRPMC completed the questionnaire. Among the seventeen potential teaching factors/skills, effective Communication Skills, enforcing equal Opportunity, and commitment to work obtained a mean score exceeding 4 out of 5. Based on the survey results, the teaching skills that received a mean score between 3.5 to 3.9 are evidence-based teaching, creativity in teaching methodology, community-based education, helping students to focus on key issues, encouraging an open and trustworthy environment, appreciating diversity, encouraging creative work, providing CME/CPD for teaching skills and leadership skills, providing positive feedback, appreciation for research, and encouraging critical thinking. Teaching based on student needs and encouraging evidence for critique has a mean score of below 3.5. The survey results will be used to create faculty development workshops for clinical teachers at FRPMC.

It is challenging to precisely define the characteristics of an effective clinical educator. However, both past and current research have consistently identified effective communication skills as a crucial attribute [11]. According to the results of the current study, the clinical faculty members highly rated effective communication skills. This suggests that clinical teachers in the field of medical sciences need to possess effective communication skills to effectively convey knowledge and information to their students. One effective method for teaching communication skills is by using role models. Clinical teachers can only be effective role models if they are confident and trained enough to transfer the skill to their students. Perron NJ et al have emphasized the importance of communication skills for clinical teachers. They have stated that trainers who possess effective communication skills are better equipped to teach these skills to their students. This highlights the significance of teaching communication skills to medical professionals. They report that trainers lacking sufficient training in communication skills lack confidence in teaching and evaluating skills they have not mastered themselves [12].

As per the results of this study, enforcing equal opportunity was recognized as a crucial teaching skill for clinical teachers in the medical field. The faculty members gave it a high rating, emphasizing its significance in offering impartial and unbiased learning opportunities to every student. Enforcing equal opportunity refers to ensuring that all students, regardless of their background, have an equal chance to succeed in their education [10]. In the context of clinical teaching in medical sciences, it refers to providing all students with equal access to resources, opportunities, and support, irrespective of their gender, race, socioeconomic status, or any other characteristic. Clinical teachers who promote equal opportunities for their students recognize the significance of establishing an all-encompassing learning atmosphere where every student feels appreciated and esteemed. They take proactive measures to identify and rectify any biases or impediments that could impede students' learning and development [13]. In an article, Darling-Hammond emphasized the importance of creating equitable educational experiences for all students by enforcing equal opportunities. Clinical teachers aim to celebrate and appreciate the diversity of their students by fostering a supportive and inclusive learning environment that promotes their success [14].

Commitment to work is another highly rated potential attribute recognized by the clinical teachers in this study. This finding emphasizes how crucial it is for clinical teachers to be devoted and enthusiastic about their profession. When teachers are committed to their work, they can effectively engage their students and provide them with the highest quality education

possible [15]. It also highlights the significance of being dependable in the role of a clinical teacher. By being committed to their work, clinical teachers can inspire and motivate their students to excel in their studies. They can also serve as positive role models, showing students the value of hard work and dedication [16]. A case study by Altun also concludes that teachers' commitment to work is a powerful driving force that motivates them to put in extra time and effort to ensure the success of their students. Their dedication to promoting student achievement inspires them to enhance their teaching practices and create an environment that facilitates learning and helps students achieve their goals. The level of teacher commitment is a crucial factor that directly affects the academic performance of students [17].

The study findings suggest that teaching based on student needs and encouraging evidence to critique were rated lower by the clinical faculty members. However, it is important to note that these attributes are still considered essential for effective clinical teaching. The lower ratings might indicate a need for improvement in these areas among the clinical faculty members at Fazaia Ruth Pfau Medical College. In contrast to these findings, Irby stated that it is essential to base teaching on the needs of students as it enables educators to customize their instructions to cater to the unique learning requirements of each student. By comprehending and addressing the specific needs of each student, clinical teachers can improve the efficacy and significance of their teaching [18].

Dornan et al stated that encouraging evidence-based critique is also vital in clinical teaching. It promotes critical thinking skills and helps students develop the ability to evaluate and analyze information critically. By encouraging students to question and critique the evidence presented to them, clinical teachers can foster a deeper understanding of the subject matter and promote a culture of evidence-based practice [19]. These findings are contrary to this study.

Although these attributes may have received lower ratings in the study, it is important to recognize their significance and work towards improving them. The findings of this study can be utilized to develop a faculty development program that focuses on enhancing these specific teaching skills among the clinical faculty members. Continuous professional development can help clinical teachers stay updated with the latest teaching methodologies and improve their effectiveness in the classroom.

CONCLUSION

The study helped us to identify key skills required by clinical faculty. The clinical faculty highlighted effective Communication Skills, enforcing equal Opportunity, and commitment to work as the most important skills among the seventeen potential teaching factors/skills..

Author's Contribution:

Concept & Design of Study:	Aurangzeb Shaikh, Fouzia Kirmani
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Conflict of Interest: The study has no conflict of interest to declare by any author.

Source of Funding: None

Ethical Approval: No. No.IRB/02 dated 06.10.2021

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Original Article

Canine Length

Determination of Tooth Length Variation of Canine Using CBCT – A Retrospective Study

Abdulaziz Abdulrahman Aleid

ABSTRACT

Objective: This study aimed to determine the variations in canine tooth length using cone beam computed tomography (CBCT) in a diverse population, examining differences across gender and age groups.

Study Design: A retrospective analysis

Place and Duration of Study: This study was conducted at the Department of Diagnostics, College of Dentistry, Qassim University, from September to November 2023.

Methods: A total of 400 CBCT scans were reviewed using the CBCT unit from Sirona Dental Systems GmbH, located in Bensheim, Hessen, Germany. The sample size was calculated to ensure a 95% confidence level with a margin of error of 0.245 mm. The study included a calibration process for examiners to ensure validity and reliability, and statistical analysis was performed using SPSS version 21.0. Data collection was done using Microsoft Excel and statistical analysis was performed using the software SPSS version 21.0.

Results: The study found a higher prevalence of males (56%) in the sample. Significant gender-based differences in canine tooth length were observed, with males generally having longer canines. No significant variations in canine length across different adult age groups were noted. The mean lengths of maxillary canines were greater than those of mandibular canines.

Conclusion: This study highlights noteworthy gender variations in canine tooth length and emphasizes the uniformity of canine length across diverse adult age groups. These discoveries hold crucial significance for clinical endodontics, particularly in the context of root canal treatment planning, and contribute to gender-specific considerations in the field of forensic odontology.

Key Words: Canine Tooth Length, CBCT, Orthodontics, Forensic Odontology, Dental Anatomy, Gender Differences, Age Groups.

Citation of article: Aleid AA. Determination of Tooth Length Variation of Canine Using CBCT – A Retrospective Study. Med Forum 2024;35(2):22-26. doi:10.60110/medforum.350205.

INTRODUCTION

Understanding the prevalence of canine tooth length emerges as a crucial inquiry in dental sciences, driven by the imperative need to delve into both functional and aesthetic aspects of dentition.[1] The present study is particularly essential within the context of endodontics and root canal treatments, where the intricate anatomy of canine teeth plays a central role in occlusal guidance and significantly influences treatment considerations. The prevalence and variability in canine length across diverse populations serve as a foundation for investigating the impact of genetic, environmental, and developmental factors on this critical dental feature.

Exploring the factors contributing to the variation in canine tooth length reveals a multifaceted interplay of genetic predisposition, environmental influences during developmental stages, and gender differences. Studies have indicated a hereditary component in tooth size and shape, while nutritional and habitual factors further contribute to the intricate diversity observed in canine length.[2] The evolutionary and biological distinctions between males and females manifest in gender-based differences, with males typically presenting longer canines.[3]

In the realm of endodontics, the significance of canine length becomes pronounced during biomechanical tooth preparation for root canal treatments. The unique anatomy of canine teeth poses challenges in finding files that align precisely with their specific length.[4] The meticulous attention required for accurate cleaning and shaping of the root canal system underscores the intricate nature of these tasks, particularly when suitable lengths of files are not readily available.[5] This highlights the necessity for innovative solutions in endodontic instrumentation to enhance precision,

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Received: December, 2023
Accepted: January, 2024
Printed: February, 2024

adaptability, and ultimately improve the efficacy of root canal treatments involving canine teeth.

Studies such as those by Naulakha et al. on the genetic foundations of tooth size variations and Patel et al. highlighting gender-based differences underscore the complexity of canine tooth length studies.[6,7] This interdisciplinary exploration, spanning from genetics to clinical endodontics, emphasizes the critical importance of comprehending human dental variation and its applications in healthcare and forensics. However, within this comprehensive landscape, a research gap exists, prompting the need for this study. The aim is to bridge this gap by providing a more nuanced understanding of the factors influencing canine tooth length variation, particularly within the context of endodontics and root canal treatments. Through this research, we strive to contribute valuable insights that enhance patient care outcomes and advance knowledge in the field of dental science.

METHODS

This retrospective study was conducted in the Department of Diagnostics at the College of Dentistry, Qassim University, from September 2023 to November 2023. The study cohort comprised patients who underwent cone beam computed tomography (CBCT) scans at the Department of Diagnostics for purposes unrelated to this study, thereby avoiding unnecessary radiation exposure solely for research objectives.

Ethical Considerations: Ethical clearance was obtained from the Institutional Review Board (IRB) of Qassim University, ensuring adherence to ethical standards and patient confidentiality. The study was conducted following the ethical principles for medical research involving human subjects as outlined in the Declaration of Helsinki.

Sampling and Sample Size Calculation: The sampling strategy involved a systematic review of the diagnostic imaging database to identify patients who underwent CBCT scans within the specified timeframe. A sample size of 400 was determined, assuming a standard deviation of 2.5 from preliminary data. This was calculated to achieve a 95% confidence level, which resulted in a margin of error of approximately 0.245 mm for the canine tooth length measurements. A stratified sampling method was employed to ensure representation across different age groups, genders, and dental health statuses.

Reliability and Validity: To ensure the validity and reliability of the measurements, the examiner underwent calibration exercises prior to the study. Repeated measures were taken on a subset of the images by the same examiner and an independent examiner to assess intra-examiner and inter-examiner reliability, respectively. This step was crucial to confirm the consistency and accuracy of the canine length measurements obtained from the CBCT scans. The reliability analysis was conducted using the Intraclass Correlation Coefficient (ICC) in SPSS, and a high ICC value (0.92) indicated a strong agreement in the measurements, thereby affirming the reliability and validity of the data collection process.

Data Collection: Data were extracted from patients' CBCT images, acquired using a CBCT unit (Sirona Dental Systems GmbH, Bensheim, Hessen, Germany) under specified exposure conditions. Canine tooth lengths were measured utilising the digital tools available in the radiographic software, ensuring accuracy and consistency. Image analysis was conducted using quantitative radiology software (Sidexis-XG software), and the data were recorded in Microsoft Excel. Patient demographics, such as age and gender, were also documented while maintaining anonymity and confidentiality. The inclusion criteria encompassed patients of all ages who underwent CBCT scans for reasons other than the study, while exclusion criteria included poor-quality images and incomplete radiographic data.

Statistical Analysis: The collected data were entered in Microsoft Excel and statistical analysis was conducted using SPSS version 21.0. Descriptive statistics were computed to summarise the mean, standard deviation, maximum, and minimum lengths of canine teeth. Categorical variables were expressed using frequency and percentage. Inferential statistical methods, including the independent t-test and ANOVA, were used to assess the differences in canine lengths across genders and age groups, respectively. A p-value of less than 0.05 was considered statistically significant for all analyses.

RESULTS

In the current study, the distribution of demographic characteristics among the 400 participants revealed a slightly higher prevalence of males compared to females. Specifically, males constituted 56% (n=224) of the sample, while females represented 44% (n=176).

Table No.1: Distribution of Demographic characteristics in the study

Characteristics	Frequency (n)	Percentage (%)
Gender		
Male	224	56
Female	176	44
Age		
20-30	178	44.5
30-40	136	34
40-50	48	12
>50	38	9.5

This gender distribution provided a balanced representation for the analysis of canine tooth length variations across different genders. In terms of age distribution, the majority of participants fell into the

younger age groups, with those aged 20-30 years comprising 44.5% (n=178) of the sample. The next largest group was the 30-40 years age group, accounting for 34% (n=136) of the participants. Individuals in the 40-50 years and >50 years age brackets represented smaller proportions, 12% (n=48) and 9.5% (n=38) respectively (Table 1). This age composition highlights a skew towards a younger population in the study, providing insights into canine tooth length variations predominantly in younger and middle-aged adults.

Table 2 presents the detailed measurements of canine tooth length across different tooth types. The mean length of the Maxillary Right Canine was observed to be 30.27 mm with a standard deviation of 2.40 mm, indicating variability in size within the sample. Its maximum and minimum lengths were 36.20 mm and 19.88 mm, respectively. Similarly, the Maxillary Left Canine showed a slightly higher mean length of 30.40 mm with a standard deviation of 2.33 mm, and it ranged from a maximum of 37.31 mm to a minimum of 21.97 mm. In the mandibular arch, the Right Canine had a mean length of 26.84 mm with a standard deviation of 2.69 mm, and lengths varying between 34.12 mm and 20.44 mm. The Mandibular Left Canine exhibited a mean length of 26.64 mm, a standard deviation of 2.67 mm, and a range from 31.53 mm to 20.21 mm. These measurements highlight the variations in canine tooth length within the population studied, with maxillary canines generally being longer than their mandibular counterparts. Figure 1 illustrates different CBCT images with canine length measurements,. depicts the maximum canine length observed among the participants included in the study.

Table 3 in the study presents a comparative analysis of canine tooth length between male and female participants, using an independent t-test to evaluate the differences. For the Maxillary Right Canine, males exhibited a mean length of 31.19 mm (±1.80 SD), while females had a mean length of 29.33 mm (±2.59 SD), with the difference being statistically significant (p-value < 0.01*). A similar pattern was observed in the Maxillary Left Canine, where the mean length for males was 31.16 mm (±2.31 SD) and for females, it was 29.61 mm (±2.09 SD), also showing a significant difference (p-value < 0.01*). In the Mandibular Right Canine, males had a mean length of 28.20 mm (±2.20 SD) compared to 25.45 mm (±2.44 SD) in females, with this variation being significant as well (p-value < 0.01*). However, for the Mandibular Left Canine, although males showed a slightly higher mean length of 27.67 mm (±2.42 SD) compared to 25.58 mm (±2.52 SD) in females, this difference was not statistically significant (p-value = 0.08). These results suggest a gender-based difference in canine tooth length for certain teeth, with males generally exhibiting longer canines than females.

Table No.2: Mean and standard deviation of canine length in different tooth

Tooth Number	Mean Length (mm)	Standard Deviation (mm)	Maximum length (mm)	Minimum length (mm)
Maxillary Right Canine	30.27	2.40	36.20	19.88
Maxillary Left Canine	30.40	2.33	37.31	21.97
Mandibular Right Canine	26.84	2.69	34.12	20.44
Mandibular Left Canine	26.64	2.67	31.53	20.21

Table 3: Comparison of Mean ± Standard Deviation (SD) of the four different teeth with Gender

Tooth Number	Male (Mean +_SD)	Female (Mean +_SD)	P value
Maxillary Right Canine	31.19 ± 1.80	29.33 ± 2.59	<0.001*
Maxillary Left Canine	31.16 ± 2.31	29.61 ± 2.09	<0.001*
Mandibular Right Canine	28.20 ± 2.20	25.45 ± 2.44	<0.001*
Mandibular Left Canine	27.67 ± 2.42	25.58 ± 2.52	0.08

Independent t test, p value <0.05*

Table 4 shows comparative analysis of the mean ± standard deviation (SD) of canine tooth length across different age groups, using the ANOVA test. The Maxillary Right Canine exhibited a mean length ranging from 30.10 mm (±1.30 SD) in the 40-50 age group to 31.01 mm (±1.35 SD) in the >50 age group. The Maxillary Left Canine showed a mean length of 30.31 mm (±3.35 SD) in the 20-30 age group and increased to 31.45 mm (±1.02 SD) in the >50 age group. For the Mandibular Right Canine, the mean length was observed to be 27.09 mm (±2.60 SD) in the 20-30 age group and slightly higher at 28.08 mm (±2.76 SD) in the >50 age group. The Mandibular Left Canine had a mean length of 27.31 mm (±2.61 SD) in the 20-30 age group, with a slight decrease to 26.48 mm (±2.79 SD) in the 40-50 age group, and then increased

back to 27.09 mm (±2.20 SD) in the >50 age group. The p-values indicated that there were no statistically significant differences in canine tooth length across the different age groups for all four teeth, as all values were above the 0.05 threshold. This finding suggests that while there are variations in tooth length within each age group, these differences are not statistically significant when compared across age groups.

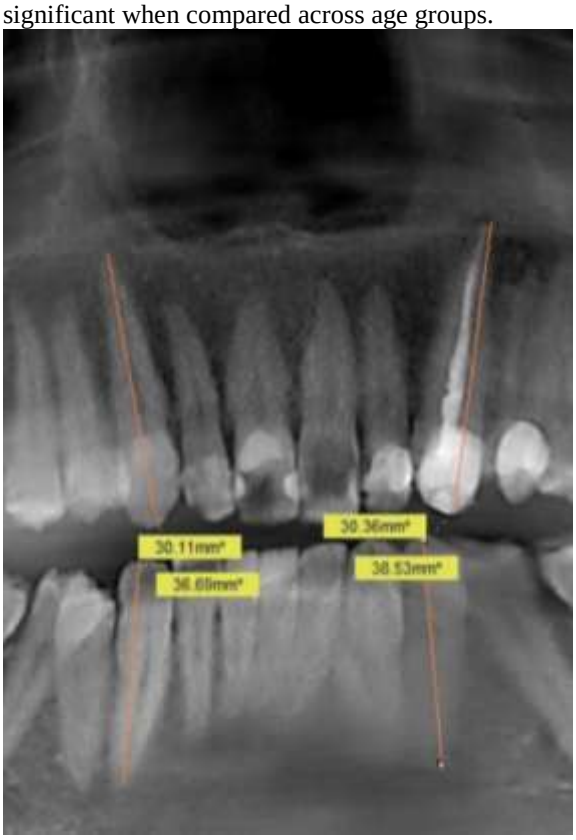

Figure No.1: Highest Canine Length Measurement Observed Among the Study Participants

DISCUSSION

The outcomes of the present study contribute valuable insights into the variations in canine tooth length across diverse demographics, particularly within the context of endodontics. The study's findings align with existing literature, highlighting variations in canine length influenced by genetic, environmental, and notably gender-related factors. The observation of longer canines in males, as supported by the current study findings, resonates with Almugla et al.'s research, emphasizing the evolutionary and biological underpinnings of these gender-based differences. The substantial variation in canine lengths between genders may reflect evolutionary adaptations favouring larger canines in males.[8]

There was no significant difference found when compared between canine length and age groups. This finding, consistent with Naseri et al.'s research, suggests that once adult tooth size is attained, canine lengths remain relatively consistent across different age brackets within an adult population. This implies that age may not be a significant factor in canine length variation, emphasizing the stability of canine lengths in adulthood.[9]

A pivotal aspect of this study was the examination of mean lengths of different canine teeth, revealing noteworthy patterns essential for endodontic considerations. The Maxillary Right and Left Canines exhibited higher mean lengths compared to their Mandibular counterparts, aligning with general dental anatomy. These measurements emphasize the importance of canines in facial aesthetics and occlusal function, factors crucial for endodontic treatment planning. Despite being shorter, the Mandibular Canines play a crucial role in maintaining lower arch integrity.

The significance of canine tooth length holds particular relevance in the realm of root canal treatment, where precise knowledge and consideration of this parameter are essential.[10] Canine teeth, with their distinct anatomy, play a pivotal role in occlusal guidance and overall dental function. Achieving optimal success in root canal treatments requires meticulous biomechanical tooth preparation, a process often complicated by challenges in finding files that align precisely with the specific length of canine teeth.[11] The accurate cleaning and shaping of the root canal system, integral to the efficacy of endodontic procedures, become intricate tasks when suitable files are not readily available. The nuances of canine tooth length, therefore, directly impact the precision and success of root canal treatments, emphasizing the need for a thorough understanding of this parameter in endodontic practice.[12]

The study's findings also hold significance in anthropological studies, offering insights into human evolution and genetic diversity.[13] In forensic odontology, the observed gender differences in canine length could contribute to gender determination methods. However, it is essential to acknowledge the study's limitations, such as its retrospective nature and reliance on existing CBCT scans. Future research could build on these findings by exploring canine length variations in more diverse populations and investigating the relationship between canine length and other dental or craniofacial features. Longitudinal studies could provide further insights into how canine length may change over time, particularly from childhood to adulthood, enhancing the understanding and application of these findings in endodontic practice.

CONCLUSION

The current study has illuminated noteworthy findings regarding canine tooth length, highlighting a pronounced gender-based difference wherein males exhibit longer canines compared to females. This gender disparity holds critical implications not only in

clinical practices but also in forensic applications for gender determination. Additionally, the research reveals a consistent canine tooth length across various adult age groups, emphasizing the stability of tooth size post-development. The observed variations in mean lengths between maxillary and mandibular canines offer valuable insights for dental practitioners, aiding in more informed and tailored approaches to treatment planning and prosthetic design.

Author's Contribution:

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Conflict of Interest: The study has no conflict of interest to declare by any author.

Source of Funding: None

Ethical Approval: No.23-43-04 dated 18.06.2023

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Original Article

Comparison of Role of Fish Skin Versus Normal Saline Dressing in Wound Healing of Chronic Diabetic Ulcer

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ABSTRACT

Objective: To compare the outcome of fish skin dressing versus normal saline dressing in wound healing of chronic diabetic ulcer

Study Design: Randomized Controlled Trial study

Place and Duration of Study: This study was conducted at the Department of Surgery, Central Park Teaching Hospital, Lahore from November 2022 to April 2023.

Methods: 122 patients; 61 in each group as per of inclusion criteria were enrolled for the study and were randomly divided in two groups. Group A patients received fish skin dressing while group B patients receive conventional normal saline dressing. Duration of healing, complete wound healing, amputation rate were noted during follow-up. SPSS v. 26 was used to analyze the data.

Results: The mean age of patients enrolled in fish skin group was 50.64 ± 11.00 years and patients enrolled in normal saline group had mean age of 53.38 ± 13.16 years. In both groups, there were 40 (65.6%) males and 21 (34.4%) females. In fish skin group, the mean time for wound healing was observed as 5.11 ± 1.54 weeks, while 7.74 ± 2.32 weeks in normal saline group. Complete wound healing was observed in 49 (80.3%) patients with fish skin dressing, while in 22 (36.1%) patients with normal saline. In fish skin group, amputation occurred in 2 (3.3%) cases while in 7 (11.5%) patients in normal saline group.

Conclusion: The healing power offish skin is more beneficial than normal saline dressing in diabetic wound ulcers. In future, we can now implement use of fish skin dressing instead of normal saline dressing.

Key Words: fish skin dressing, normal saline dressing, wound healing, diabetic ulcer

Citation of article: Rauf H, Batool A, Ahmed A, Mian A, Sikandar MZ. Comparison of Role of Fish Skin Versus Normal Saline Dressing in Wound Healing of Chronic Diabetic Ulcer. Med Forum 2024;35(2):27-31. doi:10.60110/medforum.350206.

INTRODUCTION

Uncontrolled diabetes mellitus frequently results in diabetic foot ulcers. Inadequate diabetes control not only involve foot but also other systems thus causing, peripheral neuropathy and vascular disease, and inadequate and poor foot care are the most frequent causes[1]. It also occurs in osteomyelitis of the foot and frequently necessitates lower limb amputation. The parts of the foot that are frequently strained are prone to developing these ulcers [2]. 9.1–26.1 million people worldwide get diabetic foot ulcers each year. Throughout their lives, 15–25% of persons with diabetes mellitus can develop diabetic foot ulcers. Diabetic foot ulcer cases will increase in tandem with the number of people receiving diabetes diagnoses.[3, 4]

Diabetes can cause peripheral neuropathy, reduced blood flow, elevated plantar pressures, and other problems that might result in foot ulcers. They are incredibly susceptible to disease, demise, and amputation. Treatment approaches should be chosen based on the complexity and shape of the lesion since these factors are critical to the wound healing process and the host physiological state in diabetic patients. [4] In addition to wound care, diabetic foot ulcers are treated with a combination of systemic antibiotics and surgical excision.[5]

Chronic, non-healing wounds are a major public health issue that use up a lot of healthcare resources and come with high morbidity and high financial expenses. Skin grafts are frequently employed to speed up the healing process. The skin grafts might be from the patient themselves, a human donor, or an animal donor (xenograft). Gadus morhua, or Atlantic cod, is a cold-water fish with impressive pre-clinical and clinical results in wound healing.[6] Atlantic cod (Gadus morhua) provides the source material for xenografts in the form

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Received: September, 2023
Accepted: November, 2023
Printed: February, 2024

of acellular fish skin. It's a marine animal that has its origins in cold water circumstances, which are abundant in omega-3 polyunsaturated fatty acids, in contrast to marine animals that have evolved to thrive in tropical temperatures.[7] Acellular fish skin grafts, formerly utilised only on humans for the management of difficult or chronic wounds, are now becoming an option for animals.[8]

Therefore, this trial was planned to be done in local setting to get evidence in favor of fish skin dressing and to replace less effective or slow effective dressings used in routine in local setting. This would improve our practice and would also help to attain magnitudes for local population.

METHODS

This RCT (randomized controlled trial) was conducted Department of surgery, Central Park Teaching Hospital, Lahore from November 2022 to April 2023. By using sample size formula for two proportions, sample of 122 patients; 61 in each group was estimated by keeping the 5% significance level, 80% power of study and percentage of wound healing i.e. 83.2% with fish skin dressing and 63.4% with normal saline dressing in diabetic foot ulcers.[9] Non-probability; consecutive sampling" technique was employed. Ethical concerns were fulfilled as per Helsinki declaration and approval (CPMC/IRB-No/1287) was obtained from ethical review board of Central Park Medical College. Patients aged between 35-75 years, both gender diagnosed with diabetic foot ulcers. Patients with gangrene, recurrent ulcer of same site, or already taking antibiotic or steroid treatment for ulceration, major trauma or injury, malignancy or metastatic disease, tumor resection cases.

122 patients from wards of Department of Surgery, fulfilled the above stated selection criteria, were recruited. Written consent was obtained from all the patients. Demographics of patients including name, age, gender, BMI, duration of diabetes, duration of ulcer, hypertension, smoking, were noted for each patients. Patients were divided randomly into 2 equal groups by applying random number table. In group A, fish skin dressing was applied over the ulcer wound applied to their full-thickness foot ulcerations. In group B, conventional normal saline dressing was applied on ulcer wound. All procedures were done by researcher. Then patients will be followed-up in OPD for 3 months, fortnightly. On each visit, wound was examined by researcher and granulation tissues were observed. The healing within 6 weeks was noted as complete healing. Total duration till complete healing of all patients was also observed. Patients in whom healing did not occur or wound further deteriorate, amputation was the last choice. Amputations were done under general anesthesia by a single surgical team with assistance of researcher. All the information was recorded in proforma.

Statistical Analysis: Data was entered into Microsoft Excel and was duly verified for errors and omissions after which it was exported to SPSS version 26.0 for statistical analysis. Both groups were compared for mean duration of healing by using independent samples t-test and for complete healing and amputation by using chi-square test. P-value ≤ 0.05 as significant.

RESULTS

A total of 122 patients with mean age of patients in fish skin group (Group 1) was 50.64 ± 11.00 years with the mean age of patients in normal saline group (group 2) was 53.38 ± 13.16 years. In fish skin group, there were 40 (65.6%) males and 21 (34.4%) females. In normal saline group, there were 40 (65.6%) males and 21 (34.4%) females with the male-to-female ratio as 1.9:1. In fish skin group, the mean BMI of patients was 31.45 ± 5.19 kg/m^2. In normal saline group, the mean BMI of patients was 31.45 ± 5.19 kg/m^2. In fish skin group, the history of hypertension was positive in 38 (62.3%) while 23 (37.7%) were normotensive. In normal saline group, the history of hypertension was positive in 24 (39.4%) while 37 (60.7%) were normotensive. In fish skin group, the history of smoking was positive in 27 (44.3%) while 34 (55.7%) were non-smokers. In normal saline group, the history of smoking was positive in 26 (42.6%) while 35 (57.4%) were non-smokers as explained in table 1.

Table No. 1: Basic Characteristics of Study Participants in Study Groups.

Study Parameters	Group	
	Fish skin (n=61)	**Normal saline (n=61)**
Age (years)	50.64 ± 11.00	53.38 ± 13.16
Gender Male Female	 40 (65.6%) 21 (34.4%)	 40 (65.6%) 21 (34.4%)
BMI (kg/m^2)	31.45 ± 5.19	31.72 ± 4.99
Hypertension	38 (62.3%)	24 (39.4%)
Smoking	27 (44.3%)	26 (42.6%)
Lateral side Left Right	 30 (49.2%) 31 (50.8%)	 28 (45.9%) 33 (54.1%)
Duration of diabetes (years)	8.13 ± 7.72	8.67 ± 7.74
Duration of ulcer (weeks)	12.77 ± 6.79	13.20 ± 6.29

In fish skin group, 30 (49.2%) patients had ulcer on left foot while 31 (50.8%) patients had ulcer on right foot. In normal saline group, 28 (45.9%) patients had ulcer on left foot while 33 (54.1%) patients had ulcer on right foot. The mean duration of diabetes was 8.13 ± 7.72

years in patients in fish skin group and 8.67 ± 7.74 years in normal saline group. The mean duration of ulcer was 12.77 ± 6.79 weeks in patients in fish skin group and 13.20 ± 6.29 weeks in normal saline group. Table 1.

In fish skin group, the mean time for wound healing was observed as 5.11 ± 1.54 weeks. In normal saline group, the mean time for incision was observed as 7.74 ± 2.32 weeks which was recorded as significant with p-value of < 0.0001. In fish skin group, complete wound healing was observed in 49 (80.3%) patients within 6 weeks, while in normal saline group, 22 (36.1%) patients had complete wound healing within 6 weeks and difference in both groups was highly significant (p-value < 0.0001). In fish skin group, amputation occurred in 2 (3.3%) cases due to further deterioration of ulcer, while in normal saline group, 7 (11.5%) patients underwent amputation, although the difference was insignificant (p-value > 0.05). Table - 2

Table No. 2: Comparison of Surgical Outcomes Study Groups

Outcome	Group		P-value
	Fish skin	Normal saline	
Duration of wound healing (weeks)	5.11 ± 1.54	7.74 ± 2.32	<0.0001
Complete wound healing Yes No	 49 (80.3%) 12 (19.7%)	 22 (36.1%) 39 (63.9%)	 <0.0001
Amputation Yes No	 2 (3.3%) 59 (96.7%)	 7 (11.5%) 54 (88.5%)	 0.083

DISCUSSION

Few studies have investigated the worldwide epidemiology of diabetic foot, despite its significance as a public health issue.[10] Ulcers on the feet of people with diabetes are a particularly difficult condition to manage. Thirty percent of diabetics get foot ulcers, a typical consequence of the illness. One of the main causes of impairment in people with diabetes mellitus is diabetic foot ulcers.[11] Type 2 diabetes is more prevalent than type 1 diabetes and affects males more often than women; thus, the incidence of diabetic foot ulcers is estimated to be 6.3% globally. Additionally common is the recurrence of diabetic foot sores. Within a year, the value increases by 40%, and within three years, it increases by 65%. Therefore, research should concentrate on developing preventative measures against diabetic foot ulcers.[2, 12]

The diabetic foot ulcer has a high recurrence rate and a difficult treatment time. Therefore, developing prevention techniques should be stressed the most. A multidisciplinary approach is fundamental for the anticipation and treatment of diabetic foot ulcers. Patients who are at hazard ought to be recognized, and preventative measures need to be taken based on the kind of peril. [11] Other medications for diabetic foot ulcers incorporate development components, autologous blended leucocyte, platelet, fibrin, and placental determined items, negative weight wound treatment, skin joins and substitutions, hyperbaric oxygen treatment, and stun wave treatment. There are significant caveats attached to recommending any of these treatments, and none of them are preferable to the gold standard.[13, 14]

Fish skin transplant, a novel skin replacement for wound dressing that has received FDA approval, has seen widespread application in clinical settings. Fish skin grafts have also showed promise in the treatment of a range of other recently acquired and protracted lesions, such as venous leg ulcers and diabetic foot ulcers.[7] A cold-water fish with promising preclinical and clinical outcomes in wound healing is the Atlantic cod, Gadus morhua.[15, 16]

Angle skin wounds mended much quicker than wounds treated with a dried out human amnion/ chorion film allograft (danger proportion 2.37; 95 percent certainty interim: 1.75-3.22; p = 0.0014). The comes about appear that intense biopsy wounds treated with got dried out human amnion/chorion film allograft mend more gradually than wounds treated with angle skin joins.[6]

In our trial, we observed that the mean time for wound healing was 5.11 ± 1.54 weeks with fish skin dressing, which was significantly less than 7.74 ± 2.32 weeks with normal saline dressing (p-value < 0.05). Another study found that fish skin treatment could be more cost-effective than saline dressing, healing wounds more quickly (83.2 percent vs. 63.4 percent), and causing fewer amputations (4.6 percent vs. 6.9 percent) per wound ($11,210 vs. $15,075 per wound). Angle skin treatment for diabetic foot ulcers would hence be 71.4 percent more likely to be reasonable than conventional saline dressing and 93.6 percent more likely to be cost-effective with a readiness to pay of $100,000 each quality-adjusted life year.[9]

Within 16 weeks of using a fish skin transplant, the percentage of diabetic foot ulcers healing completely is 60.3%; in 74.1 percent of cases, >90% healing has been documented; and in 84.5 percent of cases, >75% healing has been reported.[7] After 7-10 days, once the wound has been elevated by granulation tissue to the level of the wound edges and quickly epithelialized, the fish skin transplant will have been absorbed into the wound bed. The grafts made from fish skin have been

shown to speed up the healing process, prevent infection, and reduce inflammation. They are analogous to mammalian skin (i.e., containing epidermal and dermal components).

Acellular angle skin xenografts could be a great, reasonable elective for treating fractional- and superficial-thickness burns. In any case, preclinical and little cohort ponders are where the larger part of the information come from. It is essential to do bigger cohort considers within the future to completely get it the conceivable outcomes of this imaginative methodology.[17]

CONCLUSION

The healing power offish skin is more beneficial than normal saline dressing in diabetic wound ulcers. In future, we can now implement use of fish skin dressing instead of normal saline dressing to improve early healing and quality of life of patients.

Author's Contribution:

Concept & Design of Study:	Hafsa Rauf
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Conflict of Interest: The study has no conflict of interest to declare by any author.

Source of Funding: None

Ethical Approval: No. No.CPMC/IRB-No./1287 dated 01.11.2022

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Original Article

Social Barriers Obstructing Early Antenatal Care

Sumaira Jamil, Tayyaba Majeed and Tehmina Zafar

ABSTRACT

Objective: To identify and analyze social barriers that obstruct access to and utilization of antenatal care services in Pakistan.

Study Design: A cross-sectional Study

Place and Duration of Study: This study was conducted at the Obstetrics and Gynecology Department at Central Park Teaching Hospital from May 2023 to November 2023.

Methods: A total of two hundred and eighty (280) people participated in this qualitative research. Specifically, one-hundred and twenty-five (125) in-depth interviews were conducted with pregnant women aged 18 to 45 to gain insights into their experiences and perspectives on social barriers encountered during antenatal care. Additionally, a series of focus group discussions involving one hundred and fifty-five (155) participants, including pregnant women, their family members and healthcare providers, were organized to collectively explore the social barriers.

Results: The research revealed that cultural norms, limited social support, financial constraints, and gender inequalities were significant social barriers to accessing antenatal care. Participants highlighted issues such as traditional practices, lack of awareness, transportation challenges, and experiences of stigma and discrimination as major social barriers obstructing antenatal care.

Conclusion: The influence of cultural norms, limited social support, financial constraints, and gender inequalities on women's access to antenatal care services. By eliminating these barriers, it is possible to improve access to antenatal care, enhance maternal and child health outcomes, and promote equitable healthcare access for all women in Pakistan.

Key Words: Social barriers, antenatal care, cultural norms, lack of awareness, reforms.

Citation of article: Jamil S, Majeed T, Zafar T. Social Barriers Obstructing Early Antenatal Care. Med Forum 2024;35(2):32-36. doi:10.60110/medforum.350207.

INTRODUCTION

Early prenatal care must be provided if mother and child health are to be improved. It facilitates the early detection and treatment of any pregnancy issues, encourages healthful lifestyle choices, and offers vital health information and assistance. Nonetheless, a lot of pregnant women encounter societal obstacles that prevent them from receiving early prenatal care. Globally, and especially in underdeveloped nations, maternal mortality, problems during pregnancy, delivery, and the postnatal period are serious concerns[1]. Millions of women in these areas lack access to quality prenatal care, which has a negative impact on their general health.

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Received: December, 2023
Accepted: January, 2024
Printed: February, 2024

One important health intervention that can lower mother and newborn mortality is antenatal care (ANC)[2,3]. For women who are not experiencing any difficulties during their pregnancy, the World Health Organization (WHO) suggests seeing a doctor for at least four appointments. In order to enhance pregnancy outcomes, the WHO 2016 ANC model has replaced the outdated four-visit focused approach with new guidelines that call for a least of eight healthcare provider contacts (up to 12 weeks, at 20 and 26 weeks of gestation, and at 30, 34, 36, 38, and 40 weeks)[2]. Pregnant women benefit from ANC visits by learning about warning signs and symptoms, which improves both their own and their unborn child's health throughout the pregnancy, birth, and postpartum period.[2,4] However, due to issues including poverty, low educational attainment, and restricted access to healthcare facilities, ANC usage is still low in low- and middle-income nations.

In Pakistan, the primary healthcare system's maternity and child health (MCH) facilities include antenatal care. The attendance of four or more ANC appointments and the early beginning of ANC during the first trimester are very low, despite the fact that a considerable number of women make at least one ANC visit and get treatment from qualified clinicians. These percentages change according to residential location, region/

province, educational attainment, and household wealth index, among other variables.

Despite government's efforts to improve maternal and child healthcare in Pakistan, progress in reducing maternal and newborn mortality has been slow. Challenges include policy barriers, cultural norms, limited social support, financial constraints, gender inequalities, traditional practices, lack of awareness, transportation difficulties, and experiences of stigma and discrimination. These factors contribute to a preference for home deliveries and delays in seeking antenatal care, compromising the quality of care and leading to adverse pregnancy outcomes. Addressing these challenges requires comprehensive strategies targeting policy reform, cultural change, increased social support, financial assistance, improved transportation, and reducing stigma and discrimination in healthcare settings.

The provision of early antenatal care is crucial for promoting maternal and child health, but social barriers, along with other challenges in the healthcare system, hinder its effective utilization in many low- and middle-income countries like Pakistan. By addressing these barriers, policymakers and healthcare providers can improve maternal and child health outcomes and work towards achieving global health goals.

METHODS

A cross sectional study was conducted at department of gynecology and obstetrics of Central Park Teaching Hospital Lahore from May 2023 to November 2023 for assessment of social barriers in antenatal care after obtaining ethical letter (CPMC/IRB-No/1400) from institutional review board under guidelines of Helsinki declaration. Sample size of 280 was calculated as per WHO sample size calculator and patients were recruited for the study after obtaining prior written informed consent. Out of these 280, 177 were pregnant and those were considered and were taken for in depth interviews and focus group discussions for assessment of social barriers. While women who had miscarriages and those who were eclampsia and gestational diabetes mellitus were excluded from the study.

Data collection was carried out using two primary methods: in-depth interviews and focus group discussions. In-depth interviews were conducted with 125 pregnant women (Group 1), enabling to gain profound insights into their experiences and perceptions regarding ANC access. On the other hand, focus group discussions were organized for Group 2, comprising 52 pregnant women, 77 family members of patients, and 26 healthcare staff members. These discussions facilitated interactive exchanges and provided diverse perspectives on the social challenges involved in accessing ANC. To ensure consistency and comprehensiveness, a structured interview guide was employed for both in-depth interviews and focus group discussions. The interview guide covered various aspects associated with ANC access, including awareness, education, social support, traditional practices, financial constraints, and transportation challenges.

Statistical Analysis: Data was entered into Microsoft Excel, and meticulous counter-checking was performed to ensure accuracy and identify any errors or omissions. After conducting a thorough data assessment, the information was exported into SPSS version 26 for further statistical analysis. Frequency analysis revealed the prevalence of social barriers faced by the 177 pregnant women, encompassing financial constraints, cultural norms, and gender inequalities. Cross-tabulations explored the relationships between demographic factors and reported social barriers.

RESULTS

The qualitative research comprised 280 participants, categorized into two groups. Group 1 comprised 125 pregnant women who participated in in-depth interviews, providing valuable insights into their experiences and perspectives. Group 2 involved 155 individuals who engaged in focus group discussions. Group 2 was diverse and included 52 patients, 77 family members of patients, and 26 healthcare staff members, fostering interactive discussions and collective exploration of the research topic (see Table 1 below).

Table No. 1: Participants & Interviews

Group	Participants	Type of Interview
Group 1	125 pregnant women	In-depth Interviews
Group 2	52 patients, 77 family members of patients, 26 healthcare staff members	Focus Group Discussions

Moreover, out of the total 280 participants in the study, 177 were pregnant women. Among the pregnant women 62.71% (111 individuals) were between the ages of 18 to 25 years, while 37.29% (66 individuals) were aged between 26 to 35 years (see Table 2 below). This distribution highlights a significant representation of relatively young pregnant women in the research. Understanding the age profile of the pregnant participants is valuable for developing targeted interventions to address the specific needs and challenges related to maternal and child health in different age groups.

Table No. 2: Age Distribution (n=280)

Age (in years)	Number of Patients	Percentage
18-25	111	62.71%
26-35	66	37.29%

Furthermore, during the research, various social barriers impeding access to Antenatal Care (ANC) were discovered. The prevalence of each barrier among the participants shows that 28% (n=78) had lack of awareness towards ANC, 24% (n=67) had limited education, 9% (n=25) had limited social support, 12% (n=34) went through traditional practices I.e. Dai system, 16% (n=45) had financial constraints and 11% (n=31) had to face transportation challenges when it comes to taking ANC services (see Table 3 below).

Table 3: Social Barriers Obstructing Access to Antenatal Care

Social Barriers	Number of Patients	Percentage
Lack of Awareness towards ANC	78	28%
Limited Education	67	24%
Limited Social Support	25	9%
Traditional Practices (Dai system)	34	12%
Financial Constraints	45	16%
Transportation Challenges	31	11%

These findings shed light on the key social challenges faced by pregnant women in accessing ANC services. Lack of awareness about ANC, limited education, and financial constraints emerged as significant barriers affecting ANC utilization. Additionally, traditional practices, limited social support, and transportation challenges were also identified as contributing factors to hinder access to ANC services. These results highlight the need for targeted interventions and strategies to address the identified barriers and improve access to early antenatal care. Addressing these challenges can play a crucial role in promoting maternal and child health, reducing maternal and neonatal mortality, and ultimately improving overall maternal and child health outcomes.

DISCUSSION

Ensuring timely access to early antenatal care is crucial in fostering the well-being of both mothers and children. This facilitates the prompt detection and handling of possible pregnancy complications, encourages healthy practices, and offers vital health information and assistance. Despite its significance, numerous pregnant women face social obstacles that impede their ability to receive early antenatal care. After controlling all independent factors, it was evident that obstacles to achieving adequate ANC utilization (i.e., attending at least four ANC visits) were significantly associated with lack of awareness, limited education, lack of social support, adherence to traditional practices such as the Dai system, financial constraints, and transportation challenges. Each of these barriers plays a crucial role in obstructing pregnant women from accessing and utilizing early antenatal care services. The lack of knowledge among women on the significance of early prenatal care is one of the main issues noted. It's possible that many Pakistani pregnant women are unaware of all the advantages of early pregnancy counseling, such as its ability to identify and treat certain issues early on.

In addition, pregnant women who have less knowledge find it difficult to comprehend the significance of prenatal care and to successfully navigate the healthcare system. Women with less education may find it difficult to comprehend health-related information, to make wise decisions, and to speak out for their own medical needs. These educational gaps can also contribute to the spread of untruths and misunderstandings about pregnancy and medicine, which makes it harder for women to use antenatal care (ANC) facilities. Various international scholars, including M. Mazharul Islam and Mohammad Shahed Masud from Bangladesh, Mamata Sherpa Awasthi, Kiran Raj Awasthi, Harish Singh Thapa, Bhuvan Saud, Sarita Pradhan, and Roshani Agrawal Khatry from Nepal, and Yasir Bin Nisar, Michael J Dibley, from Pakistan and other scholars, have conducted studies demonstrating the association between education and ANC utilization. Their research confirms that higher levels of education positively influence ANC utilization, with more educated women being more likely to attend at least four ANC visits.[5–13]. The impact of education extends beyond ANC, as demonstrated in the research conducted by Matsumura, Masaki; Gubhaju, Bina, where highly educated individuals tend to engage in a variety of healthy behaviors more frequently than those with lower education levels[14,15]. Similarly, Dr. Pallikadavath et al. argue that education plays a crucial role in promoting adequate utilization of ANC services[16]. This issue is particularly critical for Pakistan, where only a small proportion of women (11%) have completed secondary or higher education. Moreover, in our study, the limited utilization of ANC services may indeed be attributed to the low education levels among the participating women.

Additionally, limited social support is another significant contributing factor. Social support plays a crucial role during pregnancy, but many women in Pakistan encounter insufficient or inadequate support systems. The absence of emotional, financial, and practical support from family members or the community can discourage pregnant women from seeking antenatal care. This lack of adequate support may leave them feeling disheartened or unable to prioritize their own health needs during pregnancy. Consequently, addressing these social support challenges becomes essential to enhance maternal healthcare and promote better pregnancy outcomes. By

establishing stronger support networks and community-based programs, pregnant women can receive the encouragement and assistance they need to access timely and appropriate antenatal care services. Compared to women in the lowest income quintile, women in the greatest wealth quintile were around six times more likely to attend the required number of ANC visits. This result is in line with other research[5–9, 11, 17–19], which similarly found a relationship between household affluence and ANC usage.

Interestingly, compared to women from low-income homes, women from wealthier households are more likely to be able to afford regular health treatments, like ANC, and the related expenditures, such transportation[18]. Furthermore, compared to public healthcare facilities, a greater percentage of women obtained ANC in private healthcare facilities. This discovery might be explained by the fact that women in metropolitan regions with higher household wealth tend to use private health care facilities for antenatal care (ANC). In addition to the above factors, transportation difficulties pose another significant barrier to accessing antenatal care, especially in rural and remote areas. Limited or unreliable transportation options may prevent pregnant women from reaching healthcare facilities in a timely manner. This can result in missed ANC appointments, delayed care-seeking during emergencies, and overall reduced access to antenatal care services. Addressing these social barriers requires a comprehensive approach involving various stakeholders, including policymakers, healthcare providers, community leaders, and NGOs. Efforts should focus on raising awareness about the importance of ANC, providing targeted health education, and dispelling myths and misconceptions. Improving educational opportunities for women can empower them to make informed decisions about their health and enhance healthcare-seeking behavior. Strengthening social support networks and engaging communities can play a vital role in encouraging pregnant women to prioritize their health and access ANC services.

CONCLUSION

The influence of cultural norms, limited social support, financial constraints, and gender inequalities on women's access to antenatal care services. By eliminating these barriers, it is possible to improve access to antenatal care, enhance maternal and child health outcomes, and promote equitable healthcare access for all women in Pakistan.

Author's Contribution:

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Conflict of Interest: The study has no conflict of interest to declare by any author.

Source of Funding: None
Ethical Approval: No. No.CPMC/IRB-No./1400 dated 18.05.2023

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Original Article

Indications of Titanium Mini-Plate Removal in Maxillofacial Trauma Patients

Sumaira Zahoor[1], Mohsin Majeed[2] and Asif Nazir Ch[1]

ABSTRACT

Objective: To examine the frequency of indications for the removal of mini-plates in individuals with maxillofacial trauma.

Study Design: Prospective study

Place and Duration of Study: This study was conducted at the oral and maxillofacial surgery, Nishtar Institute of Dentistry, Multan, from January to December 2021.

Methods: A total of 172 patients enrolled in study who was admitted for titanium miniplate removal, implanted for fixation after maxillofacial trauma. The collected data includes information on patients' age, gender, the indication behind miniplate removal, the specific anatomical site of removal, the duration between the initial surgery and miniplate removal.

Results: The most common fracture site was mandible 84.9% followed by maxilla 6.4%, mandible and maxilla 4.6% and least common fracture site was zygomaticomaxillary complex 4.1%. Duration of manipulates removal was below 1 year in 79% patients, 1-2 years in 9.8% patients and 11.2% were having duration above 2 years. The most common reason for plate removal demand of patients as 76.7% followed by exposure 5.2%, prosthetic rehabilitation 4.7%, extraction of tooth 4.7%, screw loosening 3.5%, pain 3.5% and infection 1.7%.

Conclusion: The primary factor leading to the removal of plates is patient preference, with exposure being the second most common reason. Rates of removal due to miniplate exposure or inflammation are consistent with previous reports, and there is insufficient evidence to advocate for the routine removal of titanium mini-plates.

Key Words: Miniplates removal, Maxillofacial trauma, Indication, Fracture site, Duration of removal

Citation of article: Zahoor S, Majeed M, Ch AN. Indications of Titanium Mini-Plate Removal in Maxillofacial Trauma Patients. Med Forum 2024;35(2):37-40. doi:10.60110/medforum.350208.

INTRODUCTION

The use of mini-plates in maxillofacial or oral surgery gained traction since their introduction in the 19th century, with increased utilization following Champy et al.'s[1] introduction of a surgical technique involving mini-plates in 1978, specifically for the management of trauma patients with maxillofacial injury and orthographic surgery[2]. Titanium is frequently chosen for mini-plates due to its superior biocompatibility and physical properties compared to other metals; however, complications like metal toxicity[3], allergy, stress shielding, metalloids, migration, palpability, and thermal sensitivity have been reported, leading to ongoing debate about the appropriate removal of this mini-plates[4].

The ongoing debate surrounding the recommendation to retain or remove miniplates after jaw surgery is fueled by concerns over complications such as plate loosening, infection and exposure of plate, which are common reasons for removal due to their potential to lead to serious consequences[5]. Infections, if left unaddressed, may necessitate removal to prevent further complications, while the compromise of stability and the potential for discomfort or pain resulting from plate loosening and exposure are additional factors supporting removal[6]. However, the act of removal itself poses risks, including pain, an increased risk of infection, and reduced stability. Furthermore, in some studies an extra problem was reported like miniplate act like a granulomas of foreign body or facial nerve entrapment[7].

Miniplates and screws, commonly employed for stabilizing fractured bones, offer both positive and negative outcomes[8]. On the positive side, these devices play a vital role in maintaining bone alignment, expediting the healing process, and restoring normal function by counteracting forces on the fractured bone, enabling quicker mobility recovery compared to traditional methods[9]. However, the decision to remove these miniplates post bone healing, though seeming beneficial for reducing discomfort, infection risks, and

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Received: October, 2023
Accepted: December, 2023
Printed: February, 2024

stress-induced bone weakening, introduces its own set of complexities in orthopedics[10,11].

Researchers' recommendations on the removal of mini-plates vary, with some suggesting removal in general, while others advise against it unless clinical symptoms arise; a clear consensus is lacking, and recent studies have yielded controversial findings, reporting removal rates ranging from 7% to 33.8%[12].

This study contributes to the development of evidence-based guidelines for maxillofacial trauma management, helping clinicians make informed decisions regarding the necessity of mini-plate removal.

METHODS

Study was conducted at department of oral and maxillofacial surgery, Nishtar Institute of Dentistry, Multan, from January to December 2021. The department received one hundred and seventy-two patients experiencing clinical symptoms or complications at previously operated sites, warranting miniplate removal, following ethical approval from the Institutional Review Board and obtaining informed consent from all patients. The collected data includes information on patients' age, gender, the indication behind miniplate removal, the specific anatomical site of removal, the duration between the initial surgery and miniplate removal.

The study investigated various reasons for the removal of miniplates, categorizing them into distinct groups such as pain, patient's request, asymptomatic miniplate exposure, infection, prosthetic rehabilitation, pediatric trauma, and other factors. The removal sites encompassed both the mandible and midface. To discern patterns, the Chi-square test was employed to analyze correlations between indications for miniplate removal concerning time gap, metallic composition, age group, and the number of miniplates present. Additionally, the study examined the correlation between the metallic composition of miniplates and the time gap for removal using the Chi-square test..

RESULTS

Overall, 172 patients were included in this study. The average age of the patients was 33.76±3.91 years. There were 109 (63.4%) males and 63 (36.6%) females. (Table. I).

The most common fracture site was mandible 146 (84.9%) followed by maxilla 11 (6.4%), mandible and maxilla 8 (4.6%) and least common fracture site was zygomaticomaxillary complex 7 (4.1%). Duration of manipulates removal was below 1 year in 135 (79%) patients, 1-2 years in 17 (9.8%) patients and 20 (11.2%) were having duration above 2 years (Table. II).

The most common reason for plate removal demand of patients as 132 (76.7%) followed by exposure 5.2%, prosthetic rehabilitation 4.7%, extraction of tooth 4.7%, screw loosening 3.5%, pain 3.5% and infection 1.7%. (Figure. I).

Table. No. 1: Demographic characteristics of the study patients

Characteristic	Presence
Age (years)	33.76±3.91
Gender	
Male	109 (63.4)
Female	63 (36.6)
Mean ± S.D, N (%)	

Table No. 2: Fracture site in plate removal of the study patients

Fracture site	N (%)
Mandible	146 (84.9)
Maxilla	11 (6.4)
Mandible and maxilla	8 (4.6)
Zygomaticomaxillary complex	7 (4.1)
Duration between miniplate insertion and removal	
Below 1 year	135 (79%)
1-2 years	17 (9.8%)
Above 2 years	20 (11.2%)

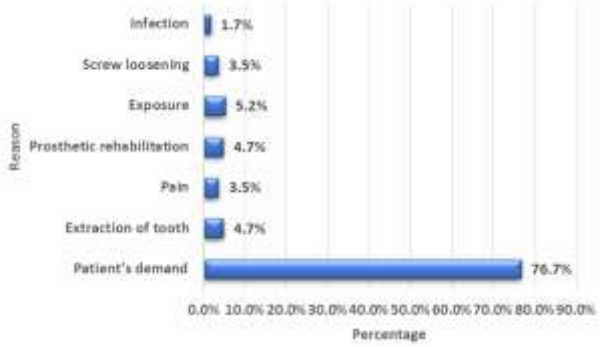

Figure No. 1: Reason for plate removal of the study patients

DISCUSSION

The removal of mini-plates in various studies lacks a clear consensus, with some researchers advocating for removal based on clinical symptoms, while others argue against it, citing factors such as biocompatibility, low complication rates, risks of general anesthesia, potential damage to adjacent structures, and the associated expenses[13]. Contrarily, proponents of mini-plate removal contend that these devices may act as foreign objects, posing a risk of complications, and emphasize concerns about growth restrictions, particularly among pediatric patients[14].

In this study average age of the patients was 33.76±3.91 years. There were 63.4% males and 36.6% females. In the study conducted by Melek et al[15], the research findings revealed a notable gender distribution among the patient population, with a significant majority being males. Specifically, out of the total cases examined, 20 individuals, constituting a substantial 71.43%, were reported to be male. Park et al[16] conducted a study

comprising 120 patients, of which 94 (78.3%) were men and 26 (21.7%) were women, with an average age of approximately 29.2 years (range, 13-79 years). The study population included 39 patients (32.5%) aged 10 to 19 years, followed by 33 patients (27.5%) aged 20 to 29 years.

Duration of manipulates removal was below 1 year in 79% patients, 1-2 years in 9.8% patients and 11.2% were having duration above 2 years. Haug et al[17], in a previous study, recommended the removal of mini-plates in pediatric patients within two to three months following fracture surgery, citing concerns about the potential risk of growth restriction.

In this study most common fracture site was mandible 84.9% followed by maxilla 6.4%, mandible and maxilla 4.6% and least common fracture site was zygomaticomaxillary complex 4.1%. Chaushu et al[18] found that mini-plate removal from the mandible is most commonly done at the mandibular angle 39.5%, followed by the mandibular body 21.1%, indicating a higher incidence of complications in these areas. In Aramanadka's study[19], it was observed that a greater number of plates were extracted from the mandibular region, with 24 out of 42 patients undergoing plate removal specifically in this area.

The most common reason for plate removal demand of patients as 76.7% followed by exposure 5.2%, prosthetic rehabilitation 4.7%, extraction of tooth 4.7%, screw loosening 3.5%, pain 3.5% and infection 1.7%. In their previous study, Khandelwal et al[20] identified infection at the surgical site or exposure of the mini-plate as the primary reasons for mini-plate removal, with a notable occurrence of infections predominantly in mini-plates situated in the anterior regions of the mandibular and maxillary bones. In the study conducted by Llandro et al[21] in 2015, the researchers found that the most prevalent reasons for plate removal, as indicated by their findings, were primarily associated with complications such as infection and/or wound dehiscence.

In their study, Ali S et al[22] found that the mandible was the most common location for plate removal, with 68.08% of the plates being removed from this area. The primary reason for plate removal was infection, accounting for 42% of cases. The minimum duration for plates to remain in situ was observed to be 3 months. In a separate study, Mulk et al[23] reported that the primary cause for plate removal in their cohort of 20 cases was infection and/or exposure, constituting 42.5% of the cases, a finding consistent with previous reports.

Limitations: If the study is conducted at a single institution, the results may not be representative of the broader population. Differences in patient demographics, treatment protocols, and surgeon expertise between institutions may impact the external validity of the findings.

CONCLUSION

The primary factor leading to the removal of plates is patient preference, with exposure being the second most common reason. Rates of removal due to inflammation or mini-plate exposure are consistent with previous reports, and there is insufficient evidence to advocate for the routine removal of titanium mini-plates..

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Conflict of Interest: The study has no conflict of interest to declare by any author.

Source of Funding: None

Ethical Approval: No.17/020 dated 24.01.2020

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Original Article

Comparison of Thoracic Epidural and Paravertebral Block for Postoperative Pain Control in Patients with Thoracotomy

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ABSTRACT

Objective: To compare post-operative analgesic effect and complications of thoracic epidural and paravertebral block in thoracotomy patients.

Study Design: Randomized clinical trial study

Place and Duration of Study: This study was conducted at the Lady Reading Hospital in Peshawar from November 2022 to October 2023.

Methods: Overall, 380 patients were included in this study both genders. Patients were divided into two groups (TPVB and TEA) by lottery method. There were 306 patients received TPVB and 74 patients received TEA. Both groups, TEB or PVB as applicable, had their respective interventions applied 30 minutes before end of surgery, with the time duly recorded.

Results: VAS score at 1 hour of thoracotomy was 3.96 ± 1.13 in TPVB group and 4.16 ± 1.22 in TEA group, at 2 hours it was 3.54±0.81 and 3.44±1.21, at 6 hours 3.08±0.93 and 3.09±0.98, at 12 hours 2.46±0.66 and 2.41±0.69, at 24 hours it was 1.97±0.28 and 1.98±0.31 in TPBV and TEA group, respectively.

Conclusion: Management of postoperative pain in thoracotomy patients, it was noted that preemptive thoracic paravertebral block (TPVB) and thoracic epidural analgesia (TEA) resulted in similar Visual Analog Scale (VAS) scores and supplemental analgesic requirements.

Key Words: Thoracic epidural analgesia, Thoracic paravertebral block, Visual analogue score, Thoracotomy, Complications

Citation of article: Imran M, Din B, Ehsan Z, Hameed J, Khattak AH, Baseer A. Comparison of Thoracic Epidural and Paravertebral Block for Postoperative Pain Control in Patients with Thoracotomy. Med Forum 2024;35(2):41-44. doi:10.60110/medforum.350209.

INTRODUCTION

Thoracotomy inflicts substantial trauma and a major contributor to severe acute pain during the postoperative period[1]. Inadequately managed acute pain following thoracotomy can elevate postoperative morbidity and extend hospitalization durations. Failure to effectively address thoracotomy-related pain may lead to the onset of chronic pain, impeding patients' ability to resume normal activities for an extended period[2,3].

Various analgesic methods, including plane blocks, thoracic epidural analgesia (TEA), intercostal nerve blocks, pleural blocks and thoracic paravertebral block (TPVB), have been proposed for thoracotomy pain management[4]. While the risk of spinal hematoma is comparatively lower in patient of normal coagulation with for block applications[5]. Despite this, thoracic epidural analgesia (TEA) continues to be regarded as the gold standard technique for managing post-thoracotomy pain[6,7].

The paravertebral space, extending on either side of the vertebral column in a wedge-shaped manner, houses structures such as the dorsal ramus, spinal nerve, sympathetic chain, rami communicantes[8]. When a local anesthetic is administered to the paravertebral space, it induces sympathetic or somatic block, unilateral analgesia, making it a suitable choice for providing anesthesia during unilateral surgical procedures in the thoracic region[9,10]. The TPVB technique can be applied bilaterally or unilaterally, offering the advantage of avoiding contralateral sympathetic block, unlike TEA, and minimizing the risk of hypotension while maintaining blood pressure[11].

Study aimed to assess and compare the effectiveness as well as the occurrence of side effects associated with the TEA and TPVB methods applied for analgesia management after thoracotomy analgesia in the context of postoperative acute pain.

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Received: November, 2023
Accepted: December, 2023
Printed: February, 2024

METHODS

This study conducted at Lady Reading Hospital in Peshawar from November 2022 to October 2023 was initiated after Ethical approval. Data of patients who underwent elective thoracic surgery at the hospital were recorded on a pre-designed performa. Inclusion criteria comprised individuals aged 18 to 80, having undergone thoracotomy, and receiving either thoracic epidural analgesia (TEA) or thoracic paravertebral block (TPVB) for postoperative pain management.

Exclusions were made for patients those operated under emergency conditions, or individuals with pre-existing chronic pain who constantly used analgesics. "Catheter failure," defined as catheter dislocation, postoperative kinking, and epidural catheter occlusion. The patients were divided into TPVB and TEA, using a lottery method.

In the TEA group, patients were prepared in aseptic environment, and skin anesthesia injected. The epidural space was accessed between T5-T7 using an 18-Gauge Tuohy needle. A four-centimeter segment of the catheter was intentionally positioned within the epidural space. To omit the risk of vascular and intrathecal injection, a test dose comprising 5 µg/ml (1:200,000) adrenaline and 3 ml of 2% lidocaine was administered, and subsequent assessment involved placing patients in the supine position and evaluating the bilateral block through a pin-prick test.

During the surgical procedure, epidural analgesia was achieved by combining 67.5 ml of 0.5% bupivacaine, 200 ml of saline, and morphine 10 mg/ml. During the initial 24-hour postoperative period, a 0.125% bupivacaine infusion was given epidurally through an elastomeric pump at a constant rate of 4 ml/h as part of our study comparing its effectiveness with thoracic paravertebral block (TPVB). Patients in the TPVB group underwent ultrasound-guided paravertebral block placement 2-3 cm lateral to T5 spinous process under general anesthesia. Patients received 1g of paracetamol every 8 hours. Patient satisfaction was categorized as satisfied, moderately satisfied, or unsatisfied.

Data analyses were conducted using SPSS for Windows, version 27.0 after analysis $p < 0.05$ was considered for all statistical analyses.

RESULTS

Overall, 380 patients were included in this study both genders. There were 306 (80.5%) patients received TPVB and 74 (19.5%) patients received TEA. The demographics and baseline characteristics of both the groups were almost equal ($p>0.050$). (Table. 1).

The distribution of VAS score, additional analgesic requirements and satisfaction level of both the study groups was almost equal ($p>0.050$). (Table. 2).

The side effects, nausea-vomiting, bradycardia, hypotension, headache, itching, sweating and respiratory depression, were more common in the patients, who received TEA as compare to the patients who received TPVB, ($p<0.001$). (Table. 3).

Table No. 1: Demographics and baseline characteristics of both the study groups

Variable	TPVB 306 (80.5%)	TEA 74 (19.5%)	p-value
Age (years)	58.52±10.25	60.63±12.42	0.342
Sex			
Male	220 (71.9)	54 (73.0)	0.853
Female	86 (28.1)	20 (27.0)	
BMI (kg/m^2)	26.21±3.48	27.82±3.52	0.174
ASA			
II	98 (32.0)	20 (27.0)	0.404
III	208 (68.0)	54 (73.0)	
Diagnosis			
Lung cancer	217 (70.9)	59 (79.7)	0.093
Bronchiectasis	38 (12.4)	9 (12.2)	
Hydatid Cyst	12 (3.9)	5 (6.8)	
Pleural thickening/effusion	11 (3.6)	1 (1.4)	
Interstitial Lung Disease	19 (6.2)	0 (0.0)	
Other	9 (2.6)	0 (0.0)	
Operation type			
Thoracotomy	224 (73.2)	55 (74.3)	0.845
VATS + Thoracotomy	82 (26.8)	19 (25.7)	
Operation			
Lung Resection	164 (53.6)	44 (59.5)	0.635
Pneumonectomy	75 (24.5)	15 (20.3)	
Exploration-Decortication	40 (13.1)	7 (9.5)	
Other	27 (8.8)	8 (10.8)	
Duration of Anesthesia	270.33±15.26	268.28±16.52	0.306

Table No. 2: Distribution of VAS score, additional analgesic requirements and satisfaction level of both the study groups

Variable	TPVB 306 (80.5%)	TEA 74 (19.5%)	p-value
VAS at 1 hour	3.96±1.13	4.16±1.22	0.197
VAS at 2 hours	3.54±0.81	3.44±1.21	0.342
VAS at 6 hours	3.08±0.93	3.09±0.98	0.944
VAS at 12 hours	2.46±0.66	2.41±0.69	0.524
VAS at 24 hours	1.97±0.28	1.98±0.31	0.796
Additional Analgesic Requirements	61 (19.9)	18 (24.3)	0.404
Satisfaction level			
Moderate	77 (25.2)	13 (17.6)	0.168
Fully satisfied	229 (74.8)	61 (82.4)	

Table No. 3: Distribution of side effects between both the study groups

Variable	TPVB 306 (80.5%)	TEA 74 (19.5%)	p-value
Nausea-vomiting	14 (18.9)	26 (35.1)	<0.001
Hypotension	8 (2.6)	13 (17.6)	<0.001
Bradycardia	26 (8.5)	19 (25.7)	<0.001
Headache	1 (0.3)	4 (5.4)	<0.001
Itching	2 (0.7)	8 (10.8)	<0.001
Sweating	1 (0.3)	6 (8.1)	<0.001
Respiratory depression	1 (0.3)	5 (6.8)	<0.001

DISCUSSION

Thoracotomy, considered one of the most painful surgical procedures, poses a significant risk of postoperative pulmonary complications, including pulmonary embolism, pain-related atelectasis, and pneumonia. Inadequate treatment of this pain can lead to heightened postoperative morbidity and an extended hospital stay[12]. After thoracotomy effective pain management can hinder these complications.

The distribution of VAS score, additional analgesic requirements and satisfaction level of both the study groups was almost equal, in a study Zengin et al[13] reported that preemptive thoracic paravertebral block (TPVB) combined with postoperative intravenous patient-controlled analgesia (PCA) and postoperative complications were less frequent when compared to TEA, while both approaches exhibited similar Visual Analog Scale (VAS) scores and additional analgesic requirements. Consequently, the findings suggest that TPVB, especially when coupled with postoperative IV PCA, may serve as a favorable alternative for preventing acute pain following thoracotomy.

Studies conducted by Karmakar et al[14] and Yeung et al[15] concluded that thoracic Epidural Analgesia (TEA), a regional analgesia technique, continues to serve as the gold standard for managing post-thoracotomy pain; however, recent studies suggest that Thoracic Paravertebral Block (TPVB), increasingly utilized in recent years, may offer a comparable or even superior analgesic effect compared to TEA.

The analgesic effect of thoracic paravertebral block (TPVB) arises from unilateral somatic and sympathetic block effects, providing pain relief across both upper and lower dermatomes within the application area. This includes achieving pain control along the thoracotomy line comparable to thoracic epidural analgesia (TEA)[16]. Our study demonstrated similar pain scores between TPVB and TEA, along with comparable rates of additional analgesic use, aligning with existing literature and supporting the efficacy of TPVB as an effective method for acute pain management following thoracotomy.

In this study side effects, nausea-vomiting, hypotension, bradycardia, headache, itching, sweating and respiratory depression, were more common in the patients, who received TEA as compare to the patients who received TPVB, the differences were statistically significant, ($p<0.001$). The use of thoracic epidural analgesia (TEA) is restricted due to the potential emergence of undesired complications, including bradycardia, hypotension, urinary retention, nausea-vomiting, and which may arise as a consequence of sympathetic block[17].

In this study additional analgesic requirement were needed in 19.9% patients in TPVB group and 24.3% in TEA group. In recent years, the acceleration of postoperative recovery, particularly in thoracic surgery, has emerged as a significant concern, with a focus on Enhanced Recovery After Surgery (ERAS) protocols. These protocols prioritize opioid-free and low complication rate analgesia strategies to support optimal patient outcomes and recovery[18].

A study was conducted by Mukherjee et al[19] and reported that patients who received PVB for postoperative analgesia had better pain relief compared to those who received TEB. Additionally, improvement with PVB not only occurred immediately after surgery but also lasted for a longer duration. Another author found that patients who received paravertebral bupivacaine plus fentanyl experienced superior pain relief however, there were no significant differences observed in supplementary analgesic requirements between the two groups.

Another study, randomly assigned 45 patients to paravertebral infusion of bupivacaine, blocks in intercostal region, thoracic epidural injection, revealing no significant differences in respiratory depression, pain reduction, or adverse events after 20 hours of block.

CONCLUSION

In terms early postoperative pain management following thoracotomy, it was noted that preemptive thoracic paravertebral block (TPVB) and thoracic epidural analgesia (TEA) resulted in similar Visual Analog Scale (VAS) scores and supplemental analgesic requirements. However, patients receiving TPVB exhibited fewer postoperative complications compared to those with TEA, suggesting that TPVB could be a viable alternative for preventing acute pain after thoracotomy.

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Conflict of Interest: The study has no conflict of interest to declare by any author.

Source of Funding: None

Ethical Approval: No. 201/LRH/MPI dated 21.11.2022

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Original Article

Personalized Multilevel Intervention for Improving Appropriate Use of Colorectal Cancer Screening

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ABSTRACT

Objective: To evaluate the efficacy of multi-level interventions aimed at enhancing colorectal cancer (CRC) screening uptake among individuals aged over 50 years, while also identifying the health and socio-demographic factors associated with increased participation.

Study Design: Randomized experimental study.

Place and Duration of Study: This study was conducted at the Department of Medicine, Nishtar Medical University, Multan from January 2017 to December 2019.

Methods: The data was collected from total of 20 basic health units involving men and women aged 50 to 74 years. Subjects were selected through simple random sampling and were subsequently randomly assigned to one of four groups. The first group received written information about colorectal cancer (CRC) screening through a letter, the second group received the information via a telephone call from health personnel, the third group attended a group meeting at their health center for the information, while the fourth group, serving as the control group, received no information.

Results: There were 29.1% participants, who provided written information, 27.3% had telephonic information, 21.7% had face-to-face information and 21.9% had control group. All the groups were almost equal with respect to demographic and clinical history, and differences were statistically insignificant, except education status and cancer history.

Conclusion: Simple interventions within the purview of primary health-care professionals, such as providing written and telephone information, have the potential to enhance participation in colorectal cancer (CRC) screening, thereby optimizing this preventive activity.

Key Words: Colorectal cancer, Multilevel intervention, Personalized, Prevention, Screening.

Citation of article: Almarshad F, Mustafa G. Personalized Multilevel Intervention for Improving Appropriate Use of Colorectal Cancer Screening. Med Forum 2024;35(2):45-49. doi:10.60110/ medforum.350210.

INTRODUCTION

Colorectal cancer (CRC) is an ideal candidate for screening due to its significant health impact, and with available tests capable of detecting it in its early stages, when treatment is most effective[1]. The scientific community strongly advocates for screening, citing a favorable benefit-risk balance, and there is widespread consensus on the importance of raising awareness among the general population, health professionals, and health authorities to prevent this disease[2,3].

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Received: October, 2023
Accepted: December, 2023
Printed: February, 2024

For an extended period, the European Union, the US Preventive Services Task Force, and the Canadian Task Force on Preventive Health Care have consistently advocated for the implementation of population-based colorectal cancer screening[4].

The fecal occult blood test (FOBT) has demonstrated a detection rate of 60-85% for tumors, while colonoscopy with polypectomy has shown the potential to reduce mortality by 60-90%, contributing to a decline in the incidence of this disease over the last two decades through early diagnosis and treatment[5,6].

Several countries have successfully initiated population-based colorectal cancer (CRC) screening programs, and more are poised to follow suit; however, the selection of screening modalities is influenced by factors such as cost, resource availability, and acceptance within the population[7]. Currently, no test has equaled the widespread availability and effectiveness of fecal occult blood tests (FOBT), a choice supported by clinical trials[8].

Primary health-care professionals play a crucial role in colorectal cancer (CRC) prevention by disseminating information about primary prevention measures, encouraging screening among the average-risk

population[9], identifying high-risk individuals through appropriate personal and family histories, and collaborating with specialized care in managing and following up individuals with specific colorectal lesions[10].

The study may lead to the development of individualized screening plans based on personal risk factors, family history, and other relevant factors.

METHODS

A randomized experimental study was conducted at department of Medicine, Nishtar Medical University, Multan, from January 2017 to December 2019. The data was collected from 20 basic health units involving men and women aged 50 to 74 years. Subjects were selected through simple random sampling and were subsequently randomly assigned to one of four groups. The first group received written information about colorectal cancer (CRC) screening through a letter, the second group received the information via a telephone call from health personnel, the third group attended a group meeting at their health center for the information, while the fourth group, serving as the control group, received no information.

To achieve a statistical power of 80% with an alpha error of 5%, and considering an expected frequency of CRC screening participation at 8% in the control group and 15% in the group subjected to the least effective intervention over a 2-year period, a total sample size of 700 participants was determined, with 325 participants required in each group.

The intervention aimed to disseminate detailed information on current preventive recommendations and screening methods through various communication channels, including written materials, telephone calls, and face-to-face interactions. The emphasis was on encouraging individuals, particularly those aged 50 to 74 years, to undergo fecal occult blood testing (FOBT) every two years as a colorectal cancer (CRC) screening method. A motivational strategy was consistently applied across all communication forms, emphasizing individual responsibility for personal health. Specifically, written information tailored for the study was created, telephone information was delivered by trained nurses, and face-to-face sessions, conducted by nurses in groups.

After the interventions were completed, subjects underwent a two-year follow-up evaluation. They were summoned to their respective health centers to participate in a questionnaire survey encompassing socio-demographic, health-related, and participation variables in colorectal cancer (CRC) screening, either within the past two years or at some point in their lives. Health professionals conducted the interviews, excluding individuals with a history of colorectal cancer or severe sensory impairment, as well as those with insufficient intellectual performance to contribute effectively to the study. Participants were required to provide written informed consent during the interview process. Approval for the study was obtained from the Clinical Research Ethics Committee of the authorities.

The responses were input into a database SPSS version 23, where they underwent thorough processing and analysis. A comparison of the variables of interest and potential confounding variables was conducted across all groups to determine if, despite the utilization of a random allocation system, homogeneity existed among the groups concerning the baseline values of the study variables.

RESULTS

Seven hundred participants both male and female were included in this study. There were 204 (29.1%) participants had written information, 191 (27.3%) had telephonic information, 152 (21.7%) had face-to-face information and 153 (21.9%) had control group. All the groups were almost equal with respect to demographic and clinical history, and differences were statistically insignificant, except education status and cancer history. (Table. I).

In this study, 133 (19.0%) cases were participated in screening whereas 567 (81.0%) cases were not participated in screening. (Figure. I). The participated and not participated cases in screening were equally distributed with respect to demographic and clinical history, and differences were statistically insignificant, ($p>0.050$). (Table. 2).

Table No.1: Demographic and clinical history of both the study groups

Variable	Written information 204 (29.1%)	Telephonic information 191 (27.3%)	Face to face information 152 (21.7%)	Control Group 153 (21.9%)	p-value
Age (years)	63.69±14.03	62.54±12.57	64.09±13.46	62.07±13.58	
Gender					
Male	99 (48.5)	82 (42.9)	69 (45.4)	65 (42.5)	0.624
Female	105 (51.5)	109 (57.1)	83 (54.6)	88 (57.5)	
Education status					
Uneducated	37(18.1)	44(23.0)	40(26.3)	35(22.9)	<0.001
Primary	151(74.0)	147(77.0)	112(73.7)	105(68.6)	
Secondary or higher	16(7.8)	0 (0.0)	0 (0.0)	13(8.5)	

Marital status					
Married	203(99.5)	188(98.4)	151(99.3)	152(99.3)	0.656
Un-married	1(0.5)	3(1.6)	1(0.7)	1(0.7)	
Area of living					
Urban	74(36.3)	60(31.4)	60(39.5)	54(35.3)	0.476
Rural	130(63.7)	131(68.6)	92(60.5)	99(64.7)	
Cancer history	20(9.8)	19(9.9)	28(18.4)	14(9.2)	0.030
Cancer history among first-degree relatives	106(52.0)	84(44.0)	64(42.1)	66(43.1)	0.200
Multimorbidity	56(27.5)	56(29.3)	38(25.0)	35(22.9)	0.555
Comorbidity	142(69.6)	143(74.9)	118(77.6)	116(75.8)	0.330
Self-perceived health	59(28.9)	54(28.3)	37(24.3)	44(28.8)	0.771
N (%), Mean ± S.D					

Figure No.1: Distribution of cases according to participation in screening

Table No.2: Association of participation in screening with demographic and clinical history of both the study groups

Variable	Participation in screening 133 (19.0%)	Not partici-pation in screening 567 (81.0%)	p-value
Age (years)	63.35±14.79	62.84±13.07	0.697
Gender			
Male	59 (44.4)	256 (45.1)	0.869
Female	74 (55.6)	311 (54.9)	
Education status			
Uneducated	26 (19.5)	130 (22.9)	0.295
Primary	104 (78.2)	411 (72.5)	
Secondary or higher	3 (3.3)	26 (4.6)	
Marital status			
Married	133 (100.0)	561 (98.9)	0.233
Un-married	0 (0.0)	6 (1.1)	
Area of living			
Urban	47 (35.3)	201 (35.4)	0.981
Rural	86 (64.7)	366 (64.6)	
Cancer history	18 (13.5)	63 (11.1)	0.432
Cancer history among first-degree relatives	55 (41.4)	265 (46.7)	0.262
Multi-morbidity	35 (26.3)	150 (26.5)	0.974
Comor-bidity	99 (74.4)	420 (74.1)	0.932
Self-perceived health	36 (27.1)	158 (27.9)	0.853
N (%), Mean ± S.D			

DISCUSSION

The primary obstacle to the success of cancer screening programs, notably in the case of colorectal cancer (CRC), is widely recognized to be low population participation, a critical factor that directly influences the effectiveness of screening and can impede positive cost-effectiveness outcomes despite ample evidence supporting the screening's efficacy. In a study by Gale et al[11] observed that since 2006, in England, where Fixed Odds Betting Terminals (FOBT) have been accessible to individuals aged 50 and above, a reported coverage of 54% has been observed, yet the reasons for this relatively low participation remain unclear.

The study conducted by López-Torres-Hidalgo J et al[12] revealed that both written and telephone information can effectively enhance participation in colorectal cancer (CRC) screening, with the potential for optimization through straightforward interventions manageable by primary health-care professionals. In this study self-perceived health is another factor that influence non participation in screening. In their study, Molina-Barceló et al[13] reported that other circum-stances, such as the absence of symptoms of the disease or not receiving a letter of invitation, were noted.

In their study, Javadzade et al[14] reported that "Lack of recommendation by doctors" emerged as one of the barriers to screening participation described in the literature. Numerous studies have consistently demonstrated that the recommendation of a health professional stands as the most influential factor in motivating individuals to participate in screening programs[15].

In this study there was not a significant difference regarding residential area as rural and urban residents have equal ratio of participation in screening. Decker et al[16] study observed wide overall variation among countries in colorectal cancer (CRC) screening participation, highlighting the need to discern regional differences and thereby enhance adherence to screening programs.

In Larkey et al[17] study, it was found that individuals residing in rural settings and those with a higher

number of health issues were the most active participants in screening procedures.

Various interventions have been investigated to assess their impact on adherence to colorectal cancer (CRC) screening. Both written and electronic communications, tailored to the specific characteristics of the population, have shown promising results, particularly among immigrant populations and even within workplace settings[18].Interventions combining written information with new technologies, such as text messages, have yielded promising results and are cost-effective[19].

The review of studies by Powe et al[20] focusing on enhancing participation in CRC screening, concludes that the most effective interventions target individuals or communities, address screening barriers, tailor messages to the population, utilize diverse communication methods, and are sustained over time.

CONCLUSION

Simple interventions within the purview of primary health-care professionals, such as providing written and telephone information, have the potential to enhance participation in colorectal cancer (CRC) screening, thereby optimizing this preventive activity.

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Conflict of Interest: The study has no conflict of interest to declare by any author.

Source of Funding: None

Ethical Approval: No. 96/01 dated 20.01.2017

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Original Article

Prevalence of Post Laparoscopic Cholecystectomy Umbilical Port Site Infection

Post Laparoscopic Cholecystectomy Umbilical Port Site Infection

Muhammad Mushtaq, Ashar Ahmad Khan, Muhammad Waqas Arshad, Shahzeb Asghar, Saim Athar and Muhammad Zubair Siddiqui

ABSTRACT

Objective: To assess the prevalence of umbilical port site infection post-cholecystectomy.
Study Design: A current descriptive cross-sectional study
Place and Duration of Study: This study was conducted at the Surgery at Ibn e Sina hospital Multan from October 2022 to March 2023.
Methods: The current descriptive cross-sectional study was conducted at the Department of Surgery at Ibn e Sina hospital Multan from October 2022 to March 2023 after approval from the institutional review board. A total of 95 participants were selected through purposive sampling technique aged from 20-70 years irrespective of their gender. Informed consent was obtained from each patient and they were assured that privacy and confidentiality will be maintained. All the individuals were at 5 days of surgery. All the data were collected through observations of patients, and lab reports, moreover, all the data were analyzed by using the latest version of SPSS 24.
Results: A total of 95 participants were selected for the present study. The age of the participants was from 20-70 years. There were 27 (28.42%) of the individuals from 31-40 years and 23 (24.21 %) of the participants were from 51-60 years of age, furthermore, 19 (20%) of the patients were from 41-50 years of age. There were 37 (39.58 %) males and 58 (60.41 %) females having male to the ratio of 0.6:1. The post-op port infection was 13 (13.68 %), however, the most common of them was umbilical 7 (53.84 %) subsequent to them was epigastric 3 (23.07 %) and 2 (15.38 %) of them were suprapubic infections.
Conclusion: The present study concluded that the most common complication among the patients who underwent cholecystectomy was umbilical infection (53.84 %) followed by epigastric infection. Therefore, this can be minimized by proper aseptic techniques and post-op care of the patients.
Key Words: cholelithiasis, laparoscopic cholecystectomy, post-op infection, gallstones

Citation of article: Mushtaq M, Khan AA, Arshad MW, Asghar S, Athar S, Siddiqui MZ. Prevalence of Post Laparoscopic Cholecystectomy Umbilical Port Site Infection. Med Forum 2024;35(2):50-53. doi:10.60110/ medforum.350211.

INTRODUCTION

Since the development of laparoscopic surgery, open gallbladder removal has essentially been phased out of medical practice[1]. Cholelithiasis, pancreas inflammation, and gallbladder stones as well as gallbladder tumors, or polyps are some of the conditions that can be treated with laparoscopic surgery[2].

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Received: October, 2023
Accepted: December, 2023
Printed: February, 2024

Gallbladder excision with a laparoscopy cholecystectomy is considered the surgical therapy of choice because it is safe and the gold standard. There is always the possibility of something going wrong during surgery; however, the risk of problems during laparoscopic surgery is significantly reduced. During the process of removing the gall bladder, one of the main complications that might arise is the rupture of a gall bladder, which can then cause bile to leak out[3]. Furthermore, there was also sufficient evidence of infection problems as a result of stones that were not collected as well as bile that spilled out[4]. The procedure most frequently conducted by general surgeons that require fundamental laparoscopic equipment is called a cholecystectomy performed using laparoscopic. Over eighty percent (80%) of instances in which stones are found in the gallbladder remain unnoticed, as well as gallstones produce indications in a small percentage of cases (between 1-4 %) yearly[5]. Surgical treatment is preferred for those with gallstones that are accompanied by symptoms; however, the "keep an eye on and patiently wait" strategy has been suggested for patients with gallstones that do not

produce symptoms[6,7]. In the years prior to the development of the laparoscopy technique for the procedure, open surgery remained the standard method for the surgical removal of gallstones.

Laparoscopy surgery to remove the gallbladder, on the other hand, has emerged as the surgical approach of choice in recent years[8,9]. Due to the fact that it has a number of advantages, such as the fact that it serves as a relatively simple and minimally invasive procedure [5]. cost productivity; correlation with a quick procedure duration, in addition to a shortened duration in the hospital, and a speedy recuperation following surgery for patients who have undergone a cholecystectomy through the laparoscopic[6,10]. Individuals undergoing challenging cases of laparoscopy for cholecystectomy are informed about postoperative morbidity and the procedure can now be considered a daycare procedure[12]. After a cholecystectomy performed using laparoscopic additional complications, such as following surgery discomfort and a high temperature, ileus, and intraoperative or postoperatively bleeding, have been recorded in the medical literature. These issues might occur at any point after the procedure[11-12]. After the procedure of laparoscopic cholecystectomy, there has been a documented occurrence of bile leakage ranging from 0.2 percent to 2 percent[11]. Around 9000 cholecystectomies were conducted over the course of 9 years, and there was a 2.3% occurrence of intra-operative bleeding, 15.9% during the operation gallbladder puncture, and a 0.1% rate of occurrence with ordinary bile duct injury[12].

METHODS

The current descriptive cross-sectional study was conducted at the Surgery at Ibn e Sina hospital Multan from October 2022 to March 2023 after approval from the institutional review board. A total of 95 participants were selected through purposive sampling technique aged from 20-70 years irrespective of their gender. Informed consent was obtained from each patient and they were assured that privacy and confidentiality will be maintained. Before the surgery ultrasound had been done for each participant to confirm their cholelithiasis. Individuals who have more age than the pre-set criteria and have diabetes Mellitus, heart diseases, hypertension, pancreatitis, and other autoimmune diseases were excluded from the study, while those who have cholelithiasis, those who were willing to participate and age according to the criteria were included in the study. All the individuals were at 5 days of surgery. All the data were collected through observations of patients, and lab reports, moreover, all the data were analyzed by using the latest version of SPSS 24.

RESULTS

A total of 95 participants were selected for the present study. The age of the participants was from 20-70 years. There were 27 (28.42%) of the individuals from 31-40 years and 23 (24.21 %) of the participants were from 51-60 years of age, furthermore, 19 (20%) of the patients were from 41-50 years of age. There were 37 (39.58 %) males and 58 (60.41 %) females having male to the ratio of 0.6:1. Table 2 highlights the post-op port site infection. The post-op port infection was 13 (13.68 %), however, the most common of them was umbilical 7 (53.84 %) subsequent to them was epigastric 3 (23.07 %) and 2 (15.38 %) of them were suprapubic infections.

Table No. 1: Demographic Characteristics

Age	Number	Percentage
20-30	12	12.63%
31-40	27	28.42 %
41-50	19	20 %
51-60	23	24.21 %
61-70	14	14.73 %
Gender		
Male	37	39.58 %
Female	58	60.41 %

Table No. 2: Post-Cholecystectomy Port Site Infections

Infection	Number	Percentage
Umbilical	7	53.84 %
Epigastric	3	23.07 %
Suprapubic	2	15.38 %
Palmer's point	1	7.69 %

DISCUSSION

Medical practitioners generally agree that laparoscopic cholecystectomy is the most effective option for people having gallstones[11]. The reason for this is that laparoscopic cholecystectomy has many benefits than the more conventional methods of getting rid of the gallbladder, that is, scarring, and a quicker recovery time, hospital stays, postoperative mortality, and other complication rapid movement of the patients[12]. Individuals shouldn't ignore port site infections as insignificant medical problems because of the lasting effects they might have on their lives[13]. Problems are possible in both open and laparoscopic procedures. Everyone of all ages along with males and females experienced port site issues, which can be broken down into two categories: complications following surgery as well as access-related difficulties[14]. In the current study, there were 27 (28.42%) of the individuals from 31-40 years and 23 (24.21 %) of the participants were from 51-60 years of age, furthermore, 19 (20%) of the patients were from 41-50 years of age.[15,16] There were 37 (39.58 %) males and 58 (60.41 %) females. A similar study conducted by Shaikh B et al that infection could be different depending on which hole is used to take the sample. The epigastric port had the highest infection rate (58%) while the umbilical port had the second-

highest infection rate (42%)[17]. In the present study, the post-op port infection was 13 (13.68 %), however, the most common of them was umbilical 7 (53.84 %) subsequent to them was epigastric 3 (23.07 %) and 2 (15.38 %) of them were suprapubic infections. Another comparable study by Ali J reported that the prevalence of infection at the port site showed 5.3%, as well as there was a statistically significant correlation between the total quantity of antibiotic treatments required with the proportion of female patients[18]. A study conducted by Ravindranath GG et al that infection around the port site occurred in 21 patients (6.4%). There was a total of 32 people, 16 female (7%) plus 5 men (5.1%). Eleven (52.4%) of infections occurred around the umbilical region, whereas eight (38.1%) occurred across the epigastric region[19]. A study conducted by Dalwani AG et al that the gender distribution consisted of men 15.5% along with females 84.5%. A majority of the participants (93.0%) went through cholecystectomy as a consequence of manifesting symptoms of cholelithiasis. Among the participants, 14.1% experienced port-site infections, which was identified as a commonly occurring complication. Additionally, the infra-umbilical site had been the most frequently affected location, with cases 26.7% exhibiting complications[20].

CONCLUSION

The present study concluded that the most common complication among the patients who underwent cholecystectomy was umbilical infection (53.84 %) followed by epigastric infection. Therefore, this can be minimized by proper aseptic techniques and post-op care of the patients.

Author's Contribution:

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Conflict of Interest: The study has no conflict of interest to declare by any author.

Source of Funding: None

Ethical Approval: No. 4451/IREB/780/March/2022 dated 18.07.2022

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Original Article

Exploring the Impact of 12-week Direct Acting Antiviral Therapy on Laboratory Parameters in HCV Patients: A Comparative Study

Saeed Anwar[1], Hira Arif[2], Azooba Fatima[3], Sajid Ali Ahmad[4], Muhammad Tariq[5] and Saeeda Itrath Batool[5]

ABSTRACT

Objective: The present study was designed to understand the hematological and chemical aspects of the patients undergoing 12-week DAA treatment therapy

Study Design: A prospective study

Place and Duration of Study: This study was conducted at the Department of Urology & Dialysis, District Headquarter Hospital Jhelum, from December 2022 to November 2023.

Methods: For clinical chemistry evaluation, serum creatinine, total bilirubin, aspartate transaminase (AST) and alanine transaminase (ALT) was tested on Cobas c701 (Roche®). For hematological evaluation, complete blood count (CBC) was done using an automated hematology analyzer (Sysmex KX-21, Japan).

Results: In this study, 380 HCV patients, including 253 male (66.5%) and 127 females (33.4%), are evaluated for the impact of Direct-Acting Antiviral (DAA) treatment. The hemoglobin (HGB) levels of males were found to start at 14.51±1.21g/dL and those of females at 12.22±1.38g/dL, according to the hematological analysis. There were 234.21±53.26x10^6/µL of platelets in the males and 218.53±42.17x10^6/µL in the females. With a decrease from 41.72±3.47% to 36.41±1.95% for males and from 39.18±2.62% to 35.74±1.67% for females, hematocrit (HCT) levels were seen in HCV patients. The concentration and mean corpuscular hemoglobin (MCH) varied significantly across the HCV patients. Reduced levels of ALT (from 50.2±8.4 IU/L to 22.35.1 IU/L) and AST (from 42.5±6.3 IU/L to 19.6±4.9 IU/L) were indicative of beneficial effects on liver function, according to hepatic parameters. HCV patients (male & females) showed improvement in renal indicators, including urea and creatinine levels.

Conclusion: The study provides a comprehensive understanding of the demographic, laboratory parameters and physiological intricacies associated with DAA therapy. The study also identified gender-based variations underscore the inevitability for initialed approaches in DAA treatment.

Key Words: HCV-Patients, Males & Females, DAA treatment, Hematological parameters, and Biochemical parameters

Citation of article: Anwar S, Arif H, Fatima A, Ahmad SA, Tariq M, Batool SI. Exploring the Impact of 12-Week Direct Acting Antiviral Therapy on Laboratory Parameters in HCV Patients: A Comparative Study. Med Forum 2024;35(2):54-59. doi:10.60110/medforum.350212.

INTRODUCTION

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Received: December, 2023
Accepted: January, 2024
Printed: February, 2024

Hepatitis C virus (HCV) is a major cause of liver-related mortality and morbidity, including cirrhosis and hepatocellular carcinoma, globally. The goal of treating this infection is to achieve a sustained virological response (SVR), which means that there is no detectable viral ribonucleic acid (RNA) six months after completing the treatment (Pawlotsky et al., 2020)[1]. Typically, an SVR is linked to the normalization of liver enzymes and the improvement or regression of liver necroinflammation and fibrosis, as well as an enhancement in liver function (Carrat et al., 2019; Mandorfer et al., 2020; Mauro et al., 2018)[2-4]. Patients with cirrhosis who clear HCV experience a notable reduction in the risk of HCC and liver-related mortality (Van Der Meer et al., 2012)[5]. However, it is important to note that the risk is not completely eliminated. This is particularly true for patients who have cofactors of liver morbidity, such as the metabolic syndrome, harmful alcohol consumption, and/or concurrent

hepatitis B virus (HBV) infection (Ioannou et al., 2018; Li et al., 2018; Nahon et al., 2017)[6-8].

There appears to be a correlation between achieving rapid virological response (RVR) and complete early virological response (cEVR) and the chances of achieving sustained virological response (SVR) in the treatment of HCV infection (Van Der Meer et al., 2012)[5]. In order to achieve a sustained virological response (SVR), it is crucial for patients to meet specific milestones throughout their treatment. These milestones involve the lack of detectable HCV RNA after 12 weeks of treatment (cEVR) or a notable reduction in HCV RNA levels at the 12th week of treatment (pEVR). Patients who fail to meet these milestones have a reduced likelihood of achieving SVR, even with an additional 36 weeks of treatment (Cacoub, Commarmond, Sadoun, & Desbois, 2017; Li et al., 2018; Thi Thu et al., 2023)[9,7,10].

Interferon based treatment regimens developed initially for HCV infection, have been associated with low cure rates and numerous adverse effects (Mandorfer et al., 2020)[3]. With the introduction of direct-acting antivirals (DAAs), significant advancements have been made in the treatment of HCV infection. Cure rates have soared to nearly 100%, and the duration of therapy has been significantly reduced, resulting in fewer side effects (Sarrazin et al., 2016)[11]. In recent years, there has been a notable shift in hepatitis C treatment guidelines due to the emergence of DAAs. Targeting key stages of the HCV life cycle, DAAs have been found to result in a higher treatment response and fewer side effects compared to traditional therapy involving interferon and ribavirin (RBV) (Bhattacharjee, Singh, Das, Chaudhuri, & Mukhopadhyay, 2021; Gutierrez, Lawitz, & Poordad, 2015)[12-13].

So, the present study was designed to understand the hematological and chemical aspects of the patients undergoing 12-week DAA treatment therapy. This could potentially help clinicians in fashioning the therapeutic regimen as per individual groups in correspondence to their response to DAA treatment. For this purpose, we recruited patients presenting with clinically diagnosed PCR confirmed HCV patients and analyzed their blood parameters for different age and gender groups.

METHODS

It was a prospective study which was conducted from December 2022 to November 2023 at department of Urology & Dialysis, District Headquarter Hospital Jhelum. A total of 380 PCR confirmed chronic HCV infected patients met the inclusion criteria were included.

Patient assessment and data collection: Data for the research study were obtained by electronic medical records and through physical examinations conducted by clinicians. Patients were examined to evaluate their adherence to medication and assess their test results. At the beginning of the study, all patients underwent an evaluation that included taking their medical history and obtaining a comprehensive clinical profile. Sustained virological response (SVR) was assessed at the conclusion of therapy using quantitative evaluation of HCV RNA using PCR along with hematological and biochemical profile (Wai et al., 2003)[14].

Clinical chemistry and hematological assessment: For clinical chemistry evaluation, serum creatinine, total bilirubin, aspartate transaminase (AST) and alanine transaminase (ALT) was tested on Cobas c701 (Roche®). For hematological evaluation, complete blood count (CBC) was done using an automated hematology analyzer (Sysmex KX-21, Japan). These tests were performed before (baseline) and after the completion of the study. Appropriate sample collection and timely processing of samples were ensured throughout this process (Ibrahim, Elsaied, & Research, 2023)[15].

Ethical considerations: The study protocols underwent a thorough assessment and received approval from the Institutional Review Board (IRB) of District Headquarter Hospital, Jhelum, under registration no. 0311 prior to the initiation of the research, the study methods, expected outcomes and benefits were explained to each participant. Since it was not an intervention-based study, so there was no harm to the patients. Informed consent forms were signed by all the study participants (Hussein, Nafady, Hassan, & Diseases, 2022)[16].

Inclusion criteria: Only those patients who willingly agreed to participate from both genders were diagnosed with chronic HCV infection, belonged to age group over 25-55 years and were not diagnosed with any other illness, included in this study. Only HCV PCR-confirmed patients were recruited for the study (Hussein et al., 2022)[16].

Exclusion criteria: The study exclusion criteria were set so that these aspects cannot affect the outcome of this study. These included the age group over 60 and below 18, patients who had known pathological/hematological abnormalities or diseases, comorbidities, patients who were diagnosed with hepatocellular carcinoma, pregnant women and those who refused to participate in the study (Hussein et al., 2022)[16].

Data Interpretation: All the data from medical reports and clinical charts were gathered in Microsoft Excel (2016). The analysis was conducted using SPSS version 20. The continuous data was presented as the mean ± standard deviation, while the nominal data was presented as frequencies and percentages. Baseline continuous data were compared to the data collected after the course of therapy using probability. The level of confidence was maintained at 95%, so a P value was

deemed significant if it was less than 0.05 (Mauro et al., 2018)[4].

RESULTS

Demographics of patients with Hepatitis-C

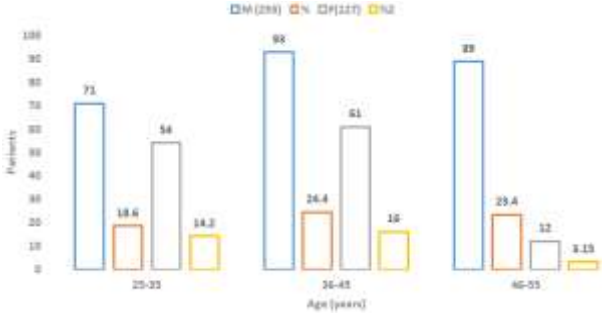

Figure No. 1: Demographic distribution of age groups among patients with Hepatitis-C

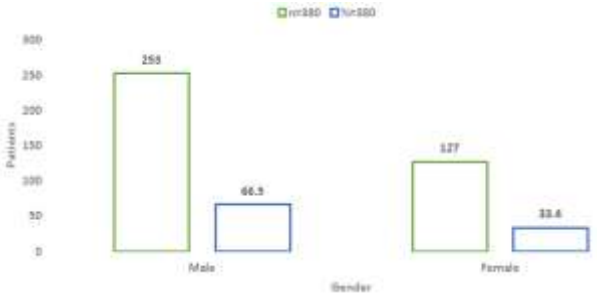

Figure 2: Demographic distribution of Gender among patients with Hepatitis-C

Hematological Profiling before Direct-Acting Antiviral therapy in HCV-Patients

Table No. 1: Comparison of Baseline Hematological Parameters between Males and Females before Direct-Acting Antiviral Therapy in HCV patients

Lab parameters	SI (Unit)	Baseline (Makhlouf et al.[17])	Baseline (Female)	P-value
HGB	g/dL	14.51±1.21	12.22±1.38	>0.05
Platelets	$x10^3/\mu L$	234.21±53.26	218.53±42.17	>0.06
WBCs	$x10^6/\mu L$	4.93±0.45	4.19±0.36	0.5
HCT	%	41.72±3.47	39.18±2.62	<0.05*
MCV	fl	88.13±5.22	83.43±4.67	<0.06
MCH	pg	26.73 ±3.21	25.33 ±1.95	<0.001**
MCHC	g/dL	32.17±0.93	31.29±0.91	<0.05*

Femtoliter (Towfighi et al.)[18], Pictogram (pg), Gram per deciliter (g/dL), Hemoglobin (HGB), White Blood Cells (WBCs), Hematocrit (HCT), Mean Corpuscular Volume (MCV), Mean Corpuscular Hemoglobin (MCH), Mean Corpuscular Hemoglobin Concentration (MCHC), Hepatitis-C (HCV) and **Significant at <0.05.

Hematological Profiling After 12-week of Direct Acting Antiviral (DAA) Therapy

Table No. 2: Hematological Parameter Changes during 12-week of Direct-Acting Antiviral Therapy in Males in HCV patients

Lab parameters	**SI (Unit)**	**Baseline (M)**	**DAA 4-weeks**	**DAA 8-weeks**	**DAA 12-weeks**
HGB	g/dL	14.51±1.21	12.22±1.38	11.8±1.15	11.2±1.03
Platelets	$x10^3/\mu L$	234.21±53.26	218.53±42.17	205.64±38.52	198.29±34.79
WBCs	$x10^6/\mu L$	4.93±0.45	4.19±0.36	3.98±0.31	3.72±0.27
HCT	%	41.72±3.47	39.18±2.62	37.93±2.18	36.41±1.95
MCV	fl	88.13±5.22	83.43±4.67	80.72±4.15	78.49±3.71
MCH	pg	26.73±3.21	25.33±1.95	24.57±1.72	23.84±1.48
MCHC	g/dL	32.17±0.93	31.29±0.91	30.85±0.82	30.42±0.75

Femtoliter (Towfighi et al.)[18], Pictogram (pg), Gram per deciliter (g/dL), Hemoglobin (HGB), White Blood Cells (WBCs), Hematocrit (HCT), Mean Corpuscular Volume (MCV), Mean Corpuscular Hemoglobin (MCH), Mean Corpuscular Hemoglobin Concentration (MCHC), Hepatitis-C (HCV) and Direct Acting Antiviral (DAA).

Table No. 3: Hematological Parameter Changes during 12-week of Direct-Acting Antiviral Therapy in Females in HCV patients

Lab parameters	SI (Unit)	Baseline (F)	DAA 4-weeks	DAA 8-weeks	DAA 12-weeks
HGB	g/dL	12.22±1.38	11.8±1.15	11.5±1.08	11.2±1.03
Platelets	$x10^3/\mu L$	218.53±42.17	205.64±38.52	198.29±34.79	192.15±31.62
WBCs	$x10^6/\mu L$	4.19±0.36	3.98±0.31	3.82±0.27	3.68±0.24

HCT	%	39.18±2.62	37.93±2.18	36.82±1.91	35.74±1.67
MCV	fl	83.43±4.67	80.72±4.15	78.95±3.81	77.21±3.48
MCH	pg	25.33±1.95	24.57±1.72	23.94±1.48	23.32±1.25
MCHC	g/dL	31.29±0.91	30.85±0.82	30.47±0.74	30.12±0.68

Femtoliter (Towfighi et al.)[18], Pictogram (pg), Gram per deciliter (g/dL), Hemoglobin (HGB), White Blood Cells (WBCs), Hematocrit (HCT), Mean Corpuscular Volume (MCV), Mean Corpuscular Hemoglobin (MCH), Mean Corpuscular Hemoglobin Concentration (MCHC), Hepatitis-C (HCV) and Direct Acting Antiviral (DAA).

Chemical pathology of patients before Direct Acting Antiviral therapy HCV-Patients

Table No. 4: Comparison of Baseline Biochemical Parameters between Males and Females before Direct-Acting Antiviral Therapy

Lab Parameters	Baseline (M)	Baseline (F)
ALT	50.2±8.4	43.0±7.2
AST	42.5±6.3	39.2±5.8
Bilirubin	2.8 ± 0.8	1.9±0.6
ALP	80.6 ± 13.2	76.5±12.0
Urea	28.4 ± 6.1	21.0±5.5
Creatinine	0.9 ± 0.2	0.6±0.1

Alanine Aminotransferase (ALT), Aspartate Aminotransferase (AST), Alkaline Phosphatase (Berkman, Sheridan, Donahue, Halpern, & Crotty)[19], Hepatitis-C (HCV).

Table No. 5: Biochemical Parameter Changes in Males during 12 weeks Direct-Acting Antiviral Therapy in HCV patients

Lab Parameters	Baseline (M)	DAA 4 Weeks	DAA 6 Weeks	DAA 12 Weeks	P-value
ALT	50.2±8.4	30.1 ± 8.7	25.5 ± 6.3	22.3 ± 5.1	0.03
AST	42.5±6.3	25.7 ± 6.2	21.8 ± 5.8	19.6 ± 4.9	0.05
Bilirubin	2.8 ± 0.8	1.2 ± 0.3	1.1 ± 0.2	1.0 ± 0.2	0.07
ALP	80.6 ± 13.2	75.3 ± 10.9	72.2 ± 9.7	70.5 ± 8.6	0.05
Urea	28.4 ± 6.1	22.1 ± 3.6	20.3 ± 2.9	18.7 ± 2.5	0.04
Creatinine	0.9 ± 0.2	0.8 ± 0.1	0.8 ± 0.1	0.7 ± 0.1	0.001**

Alanine Aminotransferase (ALT), Aspartate Aminotransferase (AST), Alkaline Phosphatase (Berkman et al.)[19], Hepatitis-C (HCV) and **Significant at <0.05.

Table No. 5(a): Biochemical Parameter Changes in Females during 12 weeks Direct-Acting Antiviral Therapy in HCV patients

Lab Parameters	Baseline (F)	DAA 4 Weeks	DAA 6 Weeks	DAA 12 Weeks	P-value
ALT	43.0±7.2	38.5±7.3	31.0±5.8	21.2±4.9	0.05
AST	39.2±5.8	38.3±6.0	26.5±5.5	19.2±4.5	0.03
Bilirubin	1.9±0.6	1.4±0.2	1.2±0.2	0.9±0.2	0.001**
ALP	76.5±12.0	68.2±9.5	65.0±8.2	66.3±7.0	0.07
Urea	21.0±5.5	20.2±3.2	18.5±2.5	17.0±2.0	0.06
Creatinine	0.6±0.1	0.7±0.1	0.7±0.1	0.6±0.1	0.02

Alanine Aminotransferase (ALT), Aspartate Aminotransferase (AST), Alkaline Phosphatase (Berkman et al.)[19], Hepatitis-C (HCV) and **Significant at <0.05.

DISCUSSION

This comprehensive study explores the multifaceted impact of Direct-Acting Antiviral (DAA) therapy on 380 HCV patients, offering insights into demographic, hematological, and physiological parameters. In the demographic analysis, the gender distribution revealed 253 males (66.5%) and 127 females (33.4%). Further delineation by age groups disclosed intriguing patterns, emphasizing the need for nuanced considerations in DAA therapy across various demographics.

We found aligned results as (Ibrahim & Elsaied, 2023)[15] reported in their study, HCV patients (males) exhibited higher baseline hemoglobin (HGB) levels (14.51±1.21 g/dL) compared to females (12.22±1.38 g/dL). Platelet counts for HCV patients (males) were 234.21±53.26x10^6/µL, and for females, they were 218.53±42.17x10^6/µL, with similar trends over the 12-week DAA therapy period. White blood cell counts demonstrated a decline from 4.93±0.45x10^3/µL at baseline to 3.72±0.27x10^3/µL at 12 weeks in HCV patients (males). HCV patients (females) exhibited a

decline from 4.19±0.36x10^3/µL to 3.68±0.24x10^3/µL over the same period.

Regarding hematocrit (HCT), HCV patients (males) showed a decline from 41.72±3.47% at baseline to 36.41±1.95% at 12 weeks, while females exhibited a decline from 39.18±2.62% to 35.74±1.67%. Mean Corpuscular Volume (MCV) demonstrated a decreasing trend in both genders, with HCV (males) declining from 88.13±5.22 fl to 78.49±3.71 fl, and females from 83.43±4.67 fl to 77.21±3.48 fl as described by (Lishnevska & Chemych, 2020b)[20].

The study of (Makhlouf et al., 2021)[17] delved into mean corpuscular hemoglobin (MCH) and mean corpuscular hemoglobin concentration (MCHC), showing significant gender-based differences. HCV patients (males) exhibited MCH levels of 26.73±3.21 pg and MCHC levels of 32.17±0.93 g/dL, while females had lower values at 25.33±1.95 pg and 31.29±0.91 g/dL, respectively.

Moving to hepatic parameters, HCV patients (males) displayed higher baseline ALT levels (50.2±8.4 IU/L) than females (39.2±5.8 IU/L), showcasing gender variations in liver health. DAA therapy demonstrated a consistent positive effect on liver function, with ALT levels decreasing to 22.35±1.1 IU/L in HCV patients (males) and 21.2±4.9 IU/L in females at 12 weeks as aligned with (Desai, Ansari, Makwana, Jadeja, & Gusani, 2020)[21]. AST levels followed a similar trend, dropping from 42.5±6.3 IU/L in HCV patients (males) and 39.2±5.8 IU/L in females at baseline to 19.6±4.9 IU/L and 19.2±4.5 IU/L, respectively, at 12 weeks (Lishnevska & Chemych, 2020a)[22]. Bilirubin levels showed a decreasing trend in both genders, with HCV (males) decreasing from 2.8±0.8 mg/dL to 1.0±0.2 mg/dL and females from 1.9±0.6 mg/dL to 0.9±0.2 mg/dL at 12 weeks. Alkaline Phosphatase (Berkman et al.)[19] levels exhibited a decline in HCV patients (males) from 80.6±13.2 IU/L to 70.5±8.6 IU/L and in females from 76.5±12.0 IU/L to 66.3±7.0 IU/L at 12 weeks, indicating a positive effect of DAA therapy on liver health (El Kassas et al., 2022)[23].

Renal parameters demonstrated noteworthy changes. Urea levels in HCV patients (males) decreased from 28.4±6.1 mg/dL at baseline to 18.7±2.5 mg/dL at 12 weeks (Saif-Al-Islam et al., 2020)[24]. Creatinine levels in HCV patients (males) decreased from 0.9±0.2 mg/dL to 0.6±0.1 mg/dL at 12 weeks. In HCV patients (females), urea levels decreased from 21.0±5.5 mg/dL to 17.0±2.0 mg/dL, and creatinine levels fluctuated from 0.6±0.1 mg/dL to 0.6±0.1 mg/dL at 12 weeks, signifying positive changes in renal function due to DAA therapy (Shiha et al., 2020)[25].

CONCLUSION

In conclusion, this study provides a comprehensive understanding of the demographic and physiological intricacies associated with DAA therapy. We identified HCV patient's variations underscore the necessity for personalized approaches in DAA treatment. These findings contribute valuable insights to the evolving landscape of DAA therapy, emphasizing the importance of considering gender-specific factors for optimized patient care. Further research is warranted to validate and extend these observations, fostering a deeper understanding of the nuanced effects of DAA therapy across diverse patient populations.

Author's Contribution:

Concept & Design of Study:	Saeed Anwar
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Data Analysis:	Sajid Ali Ahmad, Muhammad Tariq, Saeeda Itrath Batool
Revisiting Critically:	Saeed Anwar, Hira Arif
Final Approval of version:	Saeed Anwar

Conflict of Interest: The study has no conflict of interest to declare by any author.

Source of Funding: None

Ethical Approval: No. 0311/SMI dated 13.09.2022

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Original Article

Antibiotic Sensitivity and Resistance Patterns in Complicated Urinary Tract Infections in Peshawar, Pakistan

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ABSTRACT

Objective: To study the patterns of antibiotic sensitivity and resistance in complicated urinary tract infections.
Study Design: Cross sectional study
Place and Duration of Study: This study was conducted at the department of Urology at the Institute of Kidney Diseases, Peshawar, Pakistan, from May 1, 2023 to October 31, 2023.
Methods: We collected 137 urine samples from patients diagnosed with complicated UTIs and culture and sensitivity tests were performed using standard microbiological techniques.
Results: Among the positive urine samples, E.coli was found in 78 (56.9%), Klebsiella pneumoniae in 16 (11.7%) and Pseudomonas areuginosa in 14 (10.2%) of the positive cultures, respectively. Gram negative bacteria were highly sensitive to several antibiotics, including Fosfomycin (91.2%), Imipenem (84.0%), Meronem (83.3%), Amakicin (83.3%), Pipercillin/Tazobacrum (80.2%), and Nitrofuranroin (79.7%). However, they showed high resistance to Cefixime (85.5%), Ciprofloxacin (81.3%), and Co-amoxiclav (75.0%). On the other hand, Gram positive bacteria were highly sensitive to Piperaxillin/Tazobactum (100%), Imipenem (75.0%), and Meropenem (62.5%). Gram-positive bacteria showed high resistance to Cefixime and Moxifloxacin (100%), Ceftriaxone (78.6%) and Ciproflaxacin (75.0%).
Conclusion: E.coli was the most common uropathogen in patients with complicated UTIs. Nitrofurantoin, meropenem, imipenem, and amikacin were found to be effective against the majority of the bacteria. Conversely, most of the bacterial strains exhibited resistance to commonly prescribed antibiotics such as ciprofloxacin and cefixime.

Key Words: Complicated UTIs, Antibiotic sensitivity, Resistance patterns, Uropathogens

Citation of article: Nawaz A, Jan HA, Waqas, Akbar S, Hamid MS. Antibiotic Sensitivity and Resistance Patterns in Complicated Urinary Tract Infections in Peshawar, Pakistan. Med Forum 2024;35(2):60-64. doi:10.60110/medforum.350201.

INTRODUCTION

Urinary tract infection (UTI) is a frequent bacterial infection that enters the sterile urinary system via the urethra. These germs live on skin and rectum. Bladder infection (cystitis) is the most prevalent UTI. UTIs may also be kidney infections, called pyelonephritis[1]. Affected individuals' symptoms, indicators, and urinalysis are used to diagnose[2]. UTI symptoms vary on the causal agent, infection severity, and immunological response[3].

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Received: December, 2023
Accepted: January, 2024
Printed: February, 2024

UTIs are simple or complex[4]. All UTIs in males, pregnant women, immunocompromised patients, and those with fevers, stones, sepsis, urinary blockage, catheters, or kidney involvement are complicated. Bacteria—gram positive and negative—cause UTIs[5]. Most UTIs are caused by Escherichia coli, Klebsiella pneumonia, Staphylococcus, Streptococcus, and Proteus species. Several studies have linked UTIs to gender, age, prior UTI, catheterization, and hospitalisation, and poor economic position[6,7].

When UTI is suspected, urine dipstick and microscope are the major diagnostic techniques[8]. Aseptically collecting midstream pee and culture reveals the organism and its antibiotic sensitivity. However, empirical UTI treatment has caused antibiotic resistance in the pathogenic organisms[9].

Over 6 billion dollars are spent on UTIs annually, affecting almost 150 million individuals[10].UTI therapy is threatened by antibiotic resistance, as various investigations have indicated[11,12]. Uropathogen antibiotic susceptibility varies by healthcare facility (primary, tertiary, or other), environment, and geography. Misuse of antimicrobials may also cause

antimicrobial resistance and Clostridium difficile colitis[13].

Khatoon et al. studied. UTI was identified in 65.1% of Pakistani pee test patients[14]. 23% were caused by gram-positive bacteria, 76.9% by gram-negative bacteria. Gram-negative bacteria Escherichia coli caused 48.8% of UTIs. The most frequent gram-positive bacterium was Staphylococcus aureus (17.30%). In 2017, gram-negative bacteria caused 82.86% of UTIs in Peshawar[15], with Escherichia coli being the most frequent (65.02%). The most frequent gram-positive bacterium was S.aureus (40.48%). More than 82% sensitive meropenem and imipenem. In a Peshawar investigation from November 2020 to May 2021 [17], E. Coli had the greatest prevalence (47.80%) and 100% Amikacin and Meropenem sensitivity.

UTI therapy should be tailored and based on local microorganism sensitivity data[16]. UTI bacteria are becoming antimicrobial-resistant[11,12]. However, there is no contemporary research on uropathogen trends and antibiotic sensitivity in Peshawar, Pakistan. Thus, this research examined the antimicrobial susceptibility of popular medications in Peshawar patients with severe UTIs. Uropathogens from difficult UTI outpatients in a tertiary care hospital were microbiologically and antimicrobially analysed. This research will help doctors choose medications for complex UTIs based on local susceptibility patterns.

METHODS

A six-month cross-sectional research was undertaken at the Urology outpatients department of the Institute of Kidney Diseases, Peshawar, from May 1 to October 30, 2023. Before starting, the hospital ethical review board authorised the trial. Using an expected frequency of 9.85% for Pseudomonas aureginosa and a confidence level of 95%, the OpenEpi sample size calculator generated 137. Complex UTI patients 16 or older were included in the research. The sampling method was sequential non-probability. Patient exclusion criteria included catheterization, DJ stent implantation, immunocompromised, recent hospital admission, and antibiotic use within 24 hours. Patients gave informed written permission before joining the trial.

Mid-stream urine samples were collected in sterile containers and quickly processed in the microbiology lab. If delayed, samples were held at 4°C. The samples were grown overnight on blood agar and MacConkey medium with a standard loop at 37°C. Growth of > 105 CFU/mL was deemed serious bacteriuria.

Both disc diffusion and VITEK-2 compact system direct Antimicrobial Susceptibility Testing (AST) were used for antibiograms. The uropathogens were tested for sensitivity to Piperacillin-Tazobactum, Ciprofloxacin, Levofloxacin, Moxifloxacin, Co trimoxizole, Co amoxiclav, Amikacin, Gentamicin, Fosfomycin, Nitrofurantoin, Ceftriaxone, Cefixime, Meropenem, Imipenem, and Colistin. Intermediately sensitive isolates were resistant to those drugs.

IBM SPSS for Windows version 26 was used to determine UTI causative organisms and uropathogen sensitivity and resistance patterns using Google Forms data.

RESULTS

The study included 137 samples, 60 (43.8%) male and 77 (56.2%) female. The mean patient age was 43.99 with a S.D. of 16.55 and ranged from 16 to 80. There were 112 (81.8%) gram-negative and 25 (18.2%) gram-positive bacteria. 60 (53.6%) of the gram-negative bacteria were obtained from females and 52 (46.4%) from men. Gram-positive bacteria were recovered from 17 (68.0%) females and 8 (32.0%) men. The most common uropathogen in our research was E.coli (56.9%), followed by Klebsiella pneumoniae (11.7%) and Staphlococcus aureus (10.9%).

Table No. 1: Culture reports results

Uropathogens	Frequency	Percent
Escherichia coli	78	56.9
Klebsiella pneumoniae	16	11.7
Pseudomonas aerugenosa	14	10.2
Burkholderia cepacia	3	2.2
Enterobacter	1	0.7
Staphlococcus aureus	15	10.9
Streptococcus pyogenes	1	0.7
Enterococcus	9	6.6
Total	137	100.0

Table 2: Antibiotics sensitivity and resistant pattern in gram negative bacteria

Antibiotics		E coli		K Pneumoniae		P Aerugenosa		Enterobacter		B Cepacia	
Co amoxiclav	Sensitive	22	28.2%	2	12.5%	1	16.7%	0	0.0%	0	0.0%
	Resistant	56	71.8%	14	87.5%	5	83.3%	0	0.0%	0	0.0%
Co trimoxizole	Sensitive	23	31.5%	4	25.0%	0	0.0%	1	100.0%	2	66.7%
	Resistant	50	68.5%	12	75.0%	3	100.0%	0	0.0%	1	33.3%
Ceftriaxone	Sensitive	19	24.4%	1	6.3%	0	0.0%	1	100.0%	0	0.0%
	Resistant	59	75.6%	15	93.8%	0	0.0%	0	0.0%	0	0.0%
Ciprofloxacin	Sensitive	20	26.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
	Resistant	57	74.0%	16	100.0%	13	100.0%	1	100.0%	0	0.0%
Levofloxacin	Sensitive	14	26.9%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
	Resistant	38	73.1%	8	100.0%	4	100.0%	1	100.0%	3	100.0%

Moxifloxacin	Sensitive	8	24.2%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
	Resistant	25	75.8%	4	100.0%	0	0.0%	0	0.0%	0	0.0%
Nitrofurantoin	Sensitive	53	88.3%	5	41.7%	0	0.0%	1	100.0%	0	0.0%
	Resistant	7	11.7%	7	58.3%	1	100.0%	0	0.0%	0	0.0%
Fosfomycin	Sensitive	73	96.1%	9	64.3%	0	0.0%	1	100.0%	0	0.0%
	Resistant	3	3.9%	5	35.7%	0	0.0%	0	0.0%	0	0.0%
Cefixime	Sensitive	8	17.0%	0	0.0%	0	0.0%	0	0.0%	0	0.0%
	Resistant	39	83.0%	8	100.0%	0	0.0%	0	0.0%	0	0.0%
Piperacillin / Tazobactum	Sensitive	67	89.3%	9	56.3%	8	57.1%	1	100.0%	0	0.0%
	Resistant	8	10.7%	7	43.8%	6	42.9%	0	0.0%	0	0.0%
Amikacin	Sensitive	74	94.9%	10	62.5%	5	38.5%	1	100.0%	0	0.0%
	Resistant	4	5.1%	6	37.5%	8	61.5%	0	0.0%	0	0.0%
Colistin	Sensitive	4	100.0%	4	66.7%	0	0.0%	0	0.0%	0	0.0%
	Resistant	0	0.0%	2	33.3%	6	100.0%	0	0.0%	0	0.0%
Imipenem	Sensitive	73	94.8%	10	66.7%	5	38.5%	1	100.0%	0	0.0%
	Resistant	4	5.2%	5	33.3%	8	61.5%	0	0.0%	0	0.0%
Meropenem	Sensitive	72	94.7%	11	68.8%	3	25.0%	1	100.0%	3	100.0%
	Resistant	4	5.3%	5	31.3%	9	75.0%	0	0.0%	0	0.0%
Gentamicin	Sensitive	43	55.8%	4	25.0%	3	23.1%	0	0.0%	0	0.0%
	Resistant	34	44.2%	12	75.0%	10	76.9%	1	100.0%	0	0.0%

Table No. 3: Antibiotics sensitivity and resistant pattern in gram positive bacteria

Antibiotics		**Staphylococcus Aureus**		**Enterococcus**		**Streptococcus pyogenes**	
Co amoxiclav	Sensitive	4	26.7%	3	75.0%	0	0.0%
	Resistant	11	73.3%	1	25.0%	0	0.0%
Co trimoxizole	Sensitive	7	46.7%	0	0.0%	0	0.0%
	Resistant	8	53.3%	0	0.0%	0	0.0%
Ceftriaxone	Sensitive	2	15.4%	0	0.0%	1	100.0%
	Resistant	11	84.6%	0	0.0%	0	0.0%
Ciprofloxacin	Sensitive	3	30.0%	1	11.1%	1	100.0%
	Resistant	7	70.0%	8	88.9%	0	0.0%
Levofloxacin	Sensitive	3	75.0%	0	0.0%	0	0.0%
	Resistant	1	25.0%	4	100.0%	0	0.0%
Moxifloxacin	Sensitive	0	0.0%	0	0.0%	0	0.0%
	Resistant	1	100.0%	0	0.0%	0	0.0%
Nitrofurantoin	Sensitive	0	0.0%	7	100.0%	0	0.0%
	Resistant	5	100.0%	0	0.0%	0	0.0%
Fosfomycin	Sensitive	3	60.0%	1	25.0%	0	0.0%
	Resistant	2	40.0%	3	75.0%	0	0.0%
Cefixime	Sensitive	0	0.0%	0	0.0%	0	0.0%
	Resistant	3	100.0%	0	0.0%	0	0.0%
Piperacillin/Tazobactum	Sensitive	10	100.0%	0	0.0%	0	0.0%
	Resistant	0	0.0%	0	0.0%	0	0.0%
Amikacin	Sensitive	3	50.0%	0	0.0%	0	0.0%
	Resistant	3	50.0%	0	0.0%	0	0.0%
Colistin	Sensitive	2	50.0%	0	0.0%	0	0.0%
	Resistant	2	50.0%	0	0.0%	0	0.0%
Imipenem	Sensitive	9	75.0%	0	0.0%	0	0.0%
	Resistant	3	25.0%	0	0.0%	0	0.0%
Meropenem	Sensitive	5	62.5%	0	0.0%	0	0.0%
	Resistant	3	37.5%	0	0.0%	0	0.0%
Gentamicin	Sensitive	1	16.7%	1	100.0%	0	0.0%
	Resistant	5	83.3%	0	0.0%	0	0.0%

DISCUSSION

We examined the causal agents of UTI and antibiotic susceptibility in patients at the Institute of Kidney

Diseases, Peshawar's urology outpatient clinic. Gram-negative bacteria were the most prevalent uropathogen in positive urine culture samples (82.87%). These findings match Pakistani research[14,15,17].

We found Fosfomycin responsive in 91.2% of gram-negative bacteria. In the earlier Peshawar research, Meropenem and Imipenem had sensitivity of over 82.60% against gram-negative bacteria, whereas fosfonycin had sensitivity of over 73.91%[15].

According to Peshawar research, E. Coli causes the most UTIs, followed by K. Pneumoniae and Enterococcus[15,17]. Staph aureus was the third most frequent UTI causer in our research, after E. Coli and K. Penumoniae. Positive urine cultures included 6.6% enterococcus. Klebsiella was 84.6%, E.coli 68.5%, Enterobacter species 36.84%), and Proteus mirabilis 28.55% in Karachi[18]. These findings vary from our research.

E.coli is 100% sensitive to colistin, followed by Fosfomycin (96.1%), Amikacin (94.8%), and Meropenem (94.7%). A earlier Peshawar research indicated that E.coli was most responsive to Meropenem (89.39%), Imipenem (87.12%), and Fosfomycin (83.33%)[16]. Another research found that E.coli was 100% sensitive to Meropenem and Amikacin, 98.97% to Fosfomycin, Piperacillin/Tazobactum, and Imipenem[17].

Klebsiella pneumoniae was Meropenem-sensitive the most. E.coli has the greatest Meropenem sensitivity in Pakistan (16)(18). Staphylococcus aureus was most sensitive to Piperacillin/Tazobactum (100%), followed by Levofloxacin (75.0%) and Imipenem (75.0%). Shehbaz Ahmad et al. found 100% Meropenem, Imipenem, Fosfomycin, and amikacin sensitivity in stpah areus[17].

Our investigation demonstrated E.coli resistant to Cefixime (83.0%), Ceftriaxone (76.5%), Moxifloxacin (75.8%), and Ciprofloxacin (74.0%). Klebsiella pneumoniae was 100% resistant to Ciprofloxacin, Moxifloxacin, Levofloxacin, and Cefixime. Staph aureus was 100% resistant to Moxifloxacin, Nitrofurantoin, and Cefixime. In Peshawar[17], Ahmad et al. found E.coli 100% resistance to Piperacillin, followed by Cefotaxime, ceftazidime, doxyxycline (95.88%), and Ciprofloxacin (93.81%). They found Klebsiella 100% resistant to Piperacillin, 97.30% to Cefotaxime and ceftazidime, and 89.19% to ciprofloxacin. Stap aureus was 100% resistant to Erythormycin, Ciprofloxacin, Cefotaxime, Ceftazidime, and Piperacillin/Tazobactam.

Limitation: This research was done at one centre, hence the results may not reflect Peshawar, Pakistan. However, the study's cross-sectional methodology gives a snapshot in time, which may help discover trends and patterns.

CONCLUSION

Our study concluded that E. Coli was the most prevalent uropathogen, followed by K pneumoniae and S aureus. Nitrofurantoin, meropenem, imipenem, and amikacin were found to be effective against the majority of the bacteria. However, most of the bacterial strains were resistant to commonly used antibiotics such as ciprofloxacin and cefixime. All the antibiotics showed varying patterns of sensitivity and resistance. Therefore, it is highly recommended to diagnose UTI routinely and identify the bacteria causing UTI to determine the most effective antibiotic treatment to avoid the development of antibiotic resistance.

Author's Contribution:

Concept & Design of Study:	Akhtar Nawaz
Drafting:	Hafiz Asad Ullah Jan, Waqas
Data Analysis:	Siddique Akbar, Muhammad Saad Hamid
Revisiting Critically:	Akhtar Nawaz, Hafiz Asad Ullah Jan
Final Approval of version:	Akhtar Nawaz

Conflict of Interest: The study has no conflict of interest to declare by any author.

Source of Funding: None

Ethical Approval: No. 2040-ERB-1740/2022 dated March 2022

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Original Article

Awareness and Understanding of the Antimicrobial Stewardship Among Medical Professionals at Teaching Hospital of Rahim Yar Khan, Southern Punjab

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ABSTRACT

Objective: To determine the first-hand knowledge regarding awareness of antimicrobial stewardship among house officers, postgraduate trainees, and consultants working in teaching hospital of Rahim Yar Khan.

Study Design: A cross-sectional study

Place and Duration of Study: This study was conducted at the Sheikh Zayed Hospital Rahim Yar Khan from April 2023 to November 2023.

Methods: This cross-sectional single-centre study was conducted in 08 months from April 2023 to November 2023 at Sheikh Zayed Hospital Rahim Yar Khan, a teaching hospital of Southern Punjab, Pakistan. A total of 200 participants were recruited including house officers, postgraduate trainees, and consultants. A self-developed questionnaire comprised of 30 questions was distributed, and all the data was analysed by using SPSS version 23.

Results: Regardless of experience and educational attainment, the findings showed that participants lacked knowledge on antimicrobial stewardship. The results showed that just 14 individuals (7.0%), had a more improved understanding of antimicrobial stewardship. Of the participants, 87 (43.5%) had learned their information online. The house officers, postgraduate trainees, and consultants all had low level of awareness regarding antimicrobial stewardship.

Conclusion: This study showed that there is a poor knowledge of antimicrobial stewardship among medical professionals. However, the participants expressed support for the implementation of antimicrobial stewardship in all healthcare settings, including teaching institutions.

Key Words: Antimicrobial Stewardship, Medical Professional, Awareness

Citation of article: Majeed MZ, Mustafa G, Ghafoor MB, Sarwar F, Ahsan HH, Manzoor A. Awareness and Understanding of the Antimicrobial Stewardship Among Medical Professionals at Teaching Hospital of Rahim Yar Khan, Southern Punjab. Med Forum 2024;35(2):65-70. doi:10.60110/medforum.350214.

INTRODUCTION

According to the US Centres for Disease Control and Prevention (CDC), antibiotic resistance is becoming more prevalent and a bigger issue. The World Health Organisation (WHO) has identified antibiotic resistance as one of the top ten dangers. It undermines modern healthcare and enhances changes to therapy for different types of infections[1.] About 500,000 cases of infection with various strains of newly identified or antibiotic-resistant bacteria have led to a rise in its prevalence.[2,3] Antimicrobial therapy is selected according to the traits of the causing bacteria as well as the symptoms and complaints of the patient. The pathogen and colonising flora gain resistance to the antimicrobial medicine in order to gain its potency. Licenced medical professionals, including doctors and surgeons, are required to deliver their patients the greatest medication options based on their individual needs. Antimicrobial medication prescribers are tasked with two different, frequently incompatible roles. With their help, they tried to give each patient the best care possible, but they also had a responsibility to stop the spread of antibiotic resistance and maintain the usefulness of antibiotics for both current and future patients as well as the public's health.[4] The Infectious Diseases Society of America (IDSA) has acknowledged antimicrobial stewardship (AMS) as a critical intervention in the fight against antimicrobial resistance (AMR). Antimicrobial stewardship (AS), according to IDSA, is the process of optimising antimicrobial preference, the dosage, route, and duration of therapy to

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Received: December, 2023
Accepted: January, 2023
Printed: February, 2024

maximise clinical recovery or infection prevention while minimising unintended consequences, such as the emergence of resistance, adverse drug events, and cost.[5,6] As stated in AS principles, medical facilities with a well-established laboratory infrastructure for microbiology might readily switch from traditional empirical therapy to targeted therapy upon identification of culture results. The concept of the "role of education in antimicrobial stewardship" is a way to simplify or de-escalate the use of antibiotics. It has been more widely accepted as a result of the strong support of haematologists and critical care physicians. Targeted therapy saves costs and minimises unintentional exposure to broad-spectrum antibiotics. De-escalation may also entail stopping empirical antibiotic treatment based on poor culture results and clinical guidelines.[5,7,8] Targeted therapy emphasises the prescription of older, narrow-spectrum drugs. This is a common practice in northern European countries with restricted antimicrobial application, such as Scandinavia and the Netherlands, and has been taught in medical schools. Antimicrobial use has dramatically improved thanks to ASPs, and antimicrobial resistance, mortality, and healthcare costs have all decreased. It has been shown to work and employs a methodical approach to optimise antimicrobial therapy through the use of several interventions. Antibiotic prescribers should be at the forefront of the fight against antimicrobial resistance (AMR) in order to reduce improper antibiotic consumption and foster an antimicrobial stewardship (AMS) culture. In the fight against antimicrobial resistance (AMR), it is crucial to comprehend the level of knowledge, attitudes, and practices of young doctors, particularly house officers, as well as the degree to which universities and postgraduate schools view AMR as a key educational concern. Thus, the purpose of this research is to learn firsthand how well-informed house officers, postgraduate trainees, and consultants are about antimicrobial stewardship programmes (ASP).[9]

METHOD

This cross-sectional single-centre study was conducted at Sheikh Zayed Hospital Rahim Yar Khan, Pakistan from April 2023 to November 2023, by implying a self-administered questionnaire. The Ethical approval of this study has been obtained from the Institutional Review Board. This cross-sectional study comprised of a questionnaire. The responses have been compared against the definition proposed by WHO, APIC, and the Society for Healthcare Epidemiology of America (SHEA).10 All these three reliable sources included two main components of ASP; careful and need-based prescription of Antibiotics and reduce bacterial resistance. Keeping in mind these components we categorized results in 'Satisfactory' and 'Not Satisfactory' categories. This questionnaire assisted in the evaluation of the overall knowledge, attitude, and practical approach towards antibiotic usage, resistance, and Antibiotic Stewardship Program of all the participants. It comprised of 30 questions. The first two questions were open-ended while the remaining 28 questions were close-ended with two options of 'Yes' or 'No'.

Using the snowball sampling method, a total of 200 participants have been invited to be part of this study from Sheikh Zayed Hospital Rahim Yar Khan, including 68 (34%) house officers, 66 (33%) PGRs and 66 (33%) Consultants.

Statistical analysis: Statistically, the questionnaire was examined using SPSS version 23. Percentages have been calculated for the categorical data. The p-values were considered as two-tailed and a p-value of < 0.05 was set as significant.

RESULTS

More than 90 % of the participants mainly house officers were unaware of the actual concept and idea behind antimicrobial stewardship (Table-I). It also explores the level of expertise of the consultants who are the core of any medical teaching institution and shows that only 6 participants of a total of 66 have knowledge regarding antimicrobial stewardship which is alarming (p=0.7). The second question was about the different sources by which they updated their knowledge about antibiotics. A large number of participants have acquired knowledge regarding antibiotics from the internet; House officers 27 (38.2%), PGRs 31 (47%), and Consultants 29 (43.9%), followed by Pharmacology guidebooks. Few of them also need medical representatives from pharmaceutical companies or pharmacists to update their knowledge as shown in Table-2 (p=0.3).

The remaining 28 questions have 'Yes' or 'No' options. The results are presented in table-3 in the form of percentages. According to outcomes, more than 90 % of the participants have responded 'Yes' to acquiring knowledge regarding the updated antibiotic spectrum. All of the consultants have responded in favour of the knowledge regarding the spectrum of a different antibiotic, while only a few PGRs and House officers responded against it (p=0.01) with updated knowledge of antibiotics is necessary (p=0.03). More than 90 % of the consultants and PGRs have responded in favour of the updated knowledge of antibiotics in medical careers while surprisingly 26.50 % of house officers have voted against it (p=0.1). According to the results, more than 93 % of the participants have agreed that ASP improves patients' quality of life (p=0.1), with results signifies ASP reduces bacterial resistance (p=0.001) and ASP decreases hospital stays and costs (p=0.02). Most of the medical staff would like more education on antibiotic resistance (p=0.000) with hand washing plays an important role in prevention of infection (p=0.000). Surprisingly the results of prescribing broad spectrum

antibiotics before definite diagnosis was also significant (p=0.000). The analysis of results also showed that following the national guidelines before prescribing antibiotics was significant (p=0.00). Knowledge of most resistant organisms in hospital is necessary with significant results (p=0.03) and knowing the common bacteria that causes different infection in our body is also important (p=0.000). Knowing the antibiotic susceptibility pattern of different antibiotics have significant result as well (p=0.00). However contrary to common belief, the results of prescribing antibiotics in common cold, sore throat, flu, diarrhea etc. was significant with p=0.000.

Table No. 1: Knowledge regarding the Antibiotic Stewardship Program

Doctors Group	Satisfactory	Not Satisfactory	Total	P value
House officers	4(5.9%)	64(94.1%)	68 (100%)	
PGRs	4(6.1%)	62(93.9%)	66 (100%)	
Consultants	6(9.1%)	60(90.9%)	66 (100%)	0.7

Table No. 2: Source of knowledge regarding Antibiotics

Doctor Group	Medical Reps. Or pharmacist	Internet	Pharma Guidebooks	Others	Total	P Value
House officers	13(19.1%)	27(39.7%)	26(38.2%)	2(2.9%)	68	
PGRs	12(18.2%)	31(47.0%)	20(30.3%)	3(4.5%)	66	
Consultants	11(16:7%)	29(43.9%)	18(27.3%)	8(12.1%)	66	0.3

Table No. 3: Responses of participants to questions regarding Antibiotics Prescription

Questions	Consultants		PGRs		House Officers		P value
	Yes	No	Yes	No	Yes	No	
Strong Knowledge of antibiotics is important in a medical Career?	97%	3%	89.4 %	10.6 %	91.2 %	8.8%	0.1
Prescribing broad Spectrum Antibiotics causes Antibiotic Resistance?	78.8 %	21.2 %	83.3 %	16.7 %	82.4 %	17.6 %	0.6
Knowing the spectrum of different antibiotic groups is necessary?	100%	0.00 %	92.4 %	7.6%	91.2 %	8.8%	0.01
Does ASP improve the quality of patient care?	84.8 %	15.2 %	74.2 %	25.8 %	73.5 %	26.5 %	0.1
ASP Reduces Bacterial Resistance?	83.3 %	16.7 %	71.2 %	28.8 %	60.3 %	39.7 %	0.001
ASP decreases hospital stays and costs?	77.3 %	22.7 %	72.7 %	27.3 %	60.3 %	39.7 %	0.02
Updated knowledge of antibiotics is necessary?	98.5 %	1.5 %	90.9 %	9.1%	89.7 %	10.3 %	0.03
Cost-effectiveness should be considered in prescribing antibiotics?	74.2 %	25.8 %	75.8 %	24.2 %	85.3 %	14.7 %	0.13
I would like more education on antibiotic resistance?	97%	3%	90.9 %	9.1%	73.5 %	26.5 %	0.000
I would like more education on appropriate use of antibiotics?	89.4 %	10.6 %	87.9 %	12.1 %	82.4 %	17.6 %	0.2
Antibiotic Resistance is a major problem all across the world?	78.8 %	21.2 %	90.9 %	9.1%	79.4 %	20.6 %	0.04
Inappropriate use of antibiotics causes antibiotic bacterial resistance?	97%	3%	93.9 %	6.1%	92.6 %	7.4%	0.3
Patients' noncompliance is a major cause of Bacterial Resistance?	59.1 %	40.9 %	72.7 %	27.3 %	72.1 %	27.9 %	0.07
Poor infection control by health care causes bacterial resistance?	63.6 %	36.4 %	68.2 %	31.8 %	69.1 %	30.9 %	0.6
Hand washing plays an important role in prevention of infection?	98.5 %	1.5 %	87.9 %	12.1 %	79.4 %	20.6 %	0.000
Use of antibiotic in animals and poultry fields causes antibiotic bacterial resistance?	18.2 %	81.8 %	31.8 %	68.2 %	22.1 %	77.9 %	0.05

Prescribe broad spectrum antibiotics before definite diagnosis?	48.5 %	51.5 %	21.2 %	78.8 %	33.8 %	66.2 %	0.000
Prescribe narrow spectrum antibiotics when there is a definite diagnosis?	72.7 %	27.3 %	71.2 %	28.8 %	73.5 %	26.5 %	0.9
Follow the national Guidelines before prescribing antibiotics?	92.4 %	7.6 %	78.8 %	21.2 %	72.1 %	27.9 %	0.00
Knowledge of most resistant organisms in hospital is necessary?	97%	3%	87.9 %	12.1 %	88.2 %	11.8 %	0.03
Knowing the spectrum of activity of selected antibiotic is necessary?	93.9 %	6.1 %	90.9 %	9.1%	89.7 %	10.3 %	0.5
Knowing the common bacteria that causes different infection in our body is important?	98.5 %	1.5 %	86.4 %	13.6 %	70.6 %	29.4 %	0.000
Knowing the antibiotic susceptibility pattern of different antibiotics?	81.8 %	18.2 %	77.3 %	22.7 %	61.8 %	38.2 %	0.00
Contact hospital pharmacist for antibiotic choice?	43.9 %	56.1 %	43.9 %	56.1 %	54.4 %	45.6 %	0.2
Contact microbiologist to know the common resistant organisms and antibiotic susceptibility in the hospital?	83.3 %	16.7 %	80.3 %	19.7 %	82.4 %	17.6 %	0.8
Contact the clinical pharmacist to see availability of the drug?	81.8 %	18.2 %	72.7 %	27.3 %	79.4 %	20.6 %	0.2
Prescribe antibiotics in common cold, sore throat, flu, diarrhoea etc?	15.2 %	84.8 %	19.7 %	80.3 %	38.2 %	61.8 %	0.000
Interpreting an Antibiogram?	62.1 %	37.9 %	62.1 0%	37.9 %	41.2 %	58.8 %	0.2

DISCUSSION

This cross-sectional survey-based study has delivered some very contrasting results regarding antimicrobial stewardship in Rahim Yar Khan, Pakistan. As indicated by the outcomes, there were only a few individuals in all three categories who had satisfactory knowledge about the Antimicrobial Stewardship Program (ASP). The highest recorded option of 'Satisfactory' was of consultants with a frequency of 9.1 % only (p=0.7). The Internet is the most utilized source of updating knowledge among all three categories of professionals regarding antibiotics which has its benefits and losses (p=0.3).

According to Pereira et al (2015), E-learning is now widely used in the field of medical education. It is the use of technology to help teaching and learning, and it includes a variety of devices, digital tools, and media. It facilitates face-to-face, online, and mixed learning by blending traditional classroom methods with online approaches. Because the World Wide Web has made knowledge more accessible, web-based learning provides increased access to learning by overcoming distance.[10] The observed efficiency of a blended e-learning curriculum on basic health care prescription practice prompted the creation and deployment of blended modules for primary care in the United Kingdom (UK) and Scotland.[11,12] Furthermore, despite its claimed effectiveness, INTRO, an online curriculum piloted in five European nations, presented crucial cautions regarding the significance of such programs being responsive to the learning requirements and practices of diverse cultures and healthcare systems.[13]

In an article by Pulcini and Gyssens (2013), it has been mentioned that the Antibiotic Stewardship Program has been mainly conducted at the postgraduate level which could manifest the practice among the professionals. However, in most of the countries, only a small amount of effort has been made to incorporate ASP at the undergraduate level, which was regarded as a lack of attention towards health. It becomes evident that antimicrobial stewardship is more likely to be successful if it begins much earlier, during the formation of professional knowledge, attitude, and behavior.[4] The results of the current study have also similar outcomes in terms of the knowledge of house officers regarding ASP, which is alarming for an underdeveloped country. According to Gyssens (2018), AS education is required for the whole healthcare workforce as well as the general public. To have the most influence, this type of training should begin early in the undergraduate program. The AS team at hospitals must be involved in the planning and execution of a local educational program for practicing doctors as well as residents and fellows.[14]

In Pakistan, antimicrobial stewardship program is still an untested methodology for combating antibiotic resistance. There has already been a lot of work documented in other developing countries, however, opinions among Pakistani physicians on ASP are ambiguous due to a lack of local knowledge on the issue. This study found that interviewed physicians had

little awareness about ASP. As there is no ASP-related subject in the ongoing medical curriculum at both the undergraduate and postgraduate levels.[15,16,17] It is perhaps unsurprising that physicians are currently not aware of the functions of a hospital ASP. In Pakistan, the health system bears a gap in good doctor-pharmacist coordination, may it be a discussion before prescriptions or advice on a difficult case. Most doctors make decisions on their own and consider consulting a pharmacist abominable. We need to develop a good physician-pharmacist relationship in our setups to improve the quality of health care. Furthermore, the adoption of hospital ASPs in Pakistan would be difficult, but it is an urgent requirement since many nations have successfully adopted ASPs in their various hospital settings owing to their benefits in terms of patient care.18,19 Additionally, an antibiogram is a very useful measure to recognize the prevalence of any microbial infection. Unfortunately, this technique is not very common in Pakistan which eventually aggravates the antibacterial resistance among the general population. Antibiograms are very important and helpful in prescribing antibiotics in a specific population.[20]

Only a few studies have been conducted regarding awareness and implementation of antimicrobial stewardship program in Pakistan. This study has a major limitation because it is a single-centre study. Although it has been conducted in one of the main public sector medical institutes of Punjab, Pakistan this study cannot represent the views and knowledge level of all the young doctors, trainees, and consultants of Pakistan.

CONCLUSION

This report demonstrates the medical community's glaring lack of efforts in antimicrobial stewardship. It is a regular issue to provide broad-spectrum antibiotics in the absence of a definitive diagnosis. Prior to writing an antibiotic prescription, chemists are not consulted. It is imperative that medical professionals attend appropriate awareness seminars addressing antimicrobial stewardship in due course.

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Conflict of Interest: The study has no conflict of interest to declare by any author.

Source of Funding: None

Ethical Approval: No. 831/IRB/SZMC/SZH dated 21.01.2023

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Original Article

Frequency of Weight Gain in Children Receiving Treatment for Suspected Tuberculosis

Ameer Ali Jamali, Munawar Ali Siyal, Naseer Ahmad Memon, Azizullah Langah, Karam Khushik and Ali Akbar Siyal

ABSTRACT

Objective: To determine the frequency of weight gain in children receiving Treatment for suspected tuberculosis.
Study Design: A Cross-sectional Study
Place and Duration of Study: This study was conducted at the Department of Pediatrics, Peoples university of Medical Health Sciences NawabShah from 03- Jan 2023 to 03-July 2023.
Methods: Fifty children, aged six months to six years, of both genders and newly diagnosed cases of suspected TB were chosen sequentially. Children who complained of starvation refused to eat, had convulsions, were comatose, or co-infected with HIV were omitted.
Results: A mean age of 30.44 ± 10.44 months was found. (05–60 months in range). The average starting Weight was 17.50 ± 06.20 kg, while the average ending Weight was 24.78 ± 09.28 kg. The weight increase ranged from 0.4 to 14.5 kg, with a mean ± SD of 09.55 to 04.02 kg. Male children made up over two-thirds of the population; 61% (n=31) and 55% (n=30) of the youngsters had TB that was verified. After receiving therapy, weight increase in 40 children who were likely instances of tuberculosis was proven to be positive. The results of the stratification study indicated that older children, males who lived in rural areas and used four ATT medications were more likely to gain Weight.
Conclusion: Our community is heavily burdened by tuberculosis, particularly in youngsters, where diagnosis may be difficult or delayed. Gaining Weight is the primary sign that a therapy is working. The present research examined one of the fundamental problems with tuberculosis, highlighting the significance of its presence in youngsters. More research is necessary to comprehend other evolving phenomena related to presentations, diagnosis, and therapy compliance and efficacy.
Key Words: Tuberculosis, Children, Weight gain, Treatment

Citation of article: Jamali AA, Siyal MA, Memon NA, Langah A, Khushik K, Siyal AA. Frequency of Weight Gain in Children Receiving Treatment for Suspected Tuberculosis. Med Forum 2024;35(2):71-73. doi:10.60110/medforum.350215.

INTRODUCTION

Tuberculosis (TB) remains a significant global health concern, particularly in vulnerable populations such as children. Despite considerable advancements in medical science, TB continues to exert a substantial burden on healthcare systems worldwide, necessitating ongoing research efforts to enhance diagnosis, Treatment, and prevention strategies. In this context, understanding the implications of TB treatment on children's health, specifically regarding weight gain, is of paramount importance[1-2]. The prevalence of TB in children presents unique challenges due to various factors, including diagnostic complexities, limited access to healthcare resources, and the potential for adverse treatment outcomes[3]. Children, with their developing immune systems and nutritional needs, are particularly susceptible to the harmful effects of TB.

Furthermore, the nonspecific symptoms and overlapping clinical manifestations of TB with other respiratory conditions pose diagnostic dilemmas, often leading to delayed recognition and intervention[4]. Given these challenges, exploring the impact of TB treatment on weight gain in children assumes significance. Weight gain serves as a tangible indicator of treatment efficacy and overall improvement in health status. It reflects restoring nutritional status and physical well-being, crucial for children's growth and development. Understanding the factors influencing weight gain during TB treatment can inform clinical management strategies and optimize therapeutic outcomes. Against this backdrop, a cross-sectional study conducted at the Department of Pediatrics, University of Medical &

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Received: August, 2023
Accepted: September, 2023
Printed: February, 2024

Health Sciences Nawab Shah, sought to investigate the frequency of weight gain in children undergoing therapy for suspected TB. This study aimed to shed light on the dynamics of weight gain in this vulnerable population and identify potential determinants of treatment response. By elucidating the relationship between TB treatment and weight gain in children, this research contributes valuable insights to the field of pediatric TB management[5,6]. Moreover, it underscores the importance of early diagnosis, prompt initiation of Treatment, and comprehensive care delivery to mitigate the adverse effects of TB on children's health and well-being. Ultimately, such efforts are essential for achieving the global goal of TB elimination and ensuring the holistic health of future generations[7].

METHODS

In this cross-sectional study, 50 children (aged six months to 6 years) with newly diagnosed suspected TB were sequentially selected from the Department of Pediatrics, Peoples university of Medical Health Sciences NawabShah. Exclusion criteria included specific medical conditions. Weight measurements were taken before and after TB treatment to assess weight gain frequency.

RESULTS

The study found a mean age of 30.44 ± 10.44 months among participants, with initial Weight averaging 17.50 ± 06.20 kg and final weight of 24.78 ± 09.28 kg. Weight gain ranged from 0.4 to 14.5 kg, with a mean ± SD of 09.55 to 04.02 kg. Male children constituted over two-thirds of the sample, with 61% (n=31) verified with TB. After therapy, 40 children demonstrated positive weight gain. Stratification analysis suggested older age, male gender, rural residence, and use of four antitubercular medications were associated with an increased likelihood of weight gain.

Table No. 1: Participant Demographics

Age months	Initial Weight (kg)	Final Weight (kg)	Gender	TB Confirmation
24	18.2	25.5	Male	Yes
36	16.8	24.3	Female	No
42	20.1	27.8	Male	Yes
30	17.5	23.9	Male	No
48	19.3	27.0	Female	Yes

Table No. 2: Weight Gain Distribution

Weight Gain (kg)	Frequency
0.4 - 2.0	10
2.1 - 4.0	15
4.1 - 6.0	8
6.1 - 8.0	7
8.1 - 10.0	6

Table No. 3: Gender Distribution

Gender	Number of Participants
Male	35
Female	15

Table No. 4: TB Confirmation

TB Confirmation	Number of Participants
Yes	30
No	20

Table No. 5: Factors Associated with Weight Gain

Factor	Weight Gain Association
Age (months)	Positive
Gender	Positive
Residence	Positive
Number of Meds	Positive
TB Confirmation	Positive

DISCUSSION

The findings of this study shed light on the significant impact of tuberculosis (TB) treatment on weight gain in children, emphasizing the importance of early diagnosis and effective therapeutic interventions[8,9]. The observed mean weight gain of 9.55 ± 4.02 kg highlights the substantial improvement in nutritional status and overall health among children undergoing TB therapy. This underscores the crucial role of weight monitoring as a practical marker of treatment response and effectiveness[10]. The predominance of male participants and the higher proportion of TB-confirmed cases in the study population reflect the gender and epidemiological trends commonly associated with TB. Moreover, the stratification analysis revealed several factors influencing weight gain, including age, gender, residence, and the number of antitubercular medications used[11]. These findings underscore the multifactorial nature of TB treatment outcomes and highlight the importance of tailored therapeutic approaches based on individual patient characteristics[12]. The positive association between weight gain and factors such as older age, male gender, rural residence, and the use of multiple medications suggests the need for comprehensive management strategies addressing socioeconomic, cultural, and clinical determinants of TB treatment response[13]. The study underscores the challenges of TB diagnosis and management in resource-limited settings, where access to healthcare services and diagnostic tools may be constrained[14]. Overall, this study contributes valuable insights into the complex interplay between TB treatment and weight gain in children, emphasizing the need for holistic approaches to pediatric TB care. Future research endeavours should focus on elucidating the underlying mechanisms driving treatment outcomes and optimizing therapeutic strategies to mitigate the burden of TB in vulnerable populations[15].

CONCLUSION

This study underscores the significant association between tuberculosis treatment and weight gain in children, highlighting the efficacy of therapy in improving nutritional status and overall health. The findings emphasize the importance of early diagnosis, prompt initiation of Treatment, and tailored management approaches based on individual patient characteristics. Furthermore, the study underscores the need for comprehensive pediatric TB care strategies addressing socioeconomic and clinical determinants of treatment response. By elucidating the dynamics of weight gain during TB therapy, this research contributes valuable insights to optimising pediatric TB management. It underscores the imperative of ongoing research efforts in this field.

Acknowledgement: We thank the hospital administration and everyone who helped us complete this study.

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Conflict of Interest: The study has no conflict of interest to declare by any author.

Source of Funding: None

Ethical Approval: No. No.PUMHSW/SBA/ERB/ 430/PVC dated 22.09.2022

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Original Article

Composition of Bacterial Isolates in Children with Thoracic Empyema : A Cross-sectional Study

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ABSTRACT

Objective: To determine how often the University of Medical & Health Sciences Nawab Shah Department of Pediatrics receives bacterial isolates from children with thoracic empyema.

Study Design: A Cross-sectional Study

Place and Duration of Study: This study was conducted at the Department of Pediatrics, University of Medical Health Sciences Nawab Shah from March 2023 to August 2023.

Methods: All patients admitted to the University of Medical & Health Sciences Nawab Shah's paediatrics department who satisfied the study's inclusion requirements were enrolled. Informed consent was acquired after education regarding the procedure, its risks, and the benefits of the study. Chest X-rays were obtained of each patient at admission, throughout the insertion, removal, and discharge of the intercostal tube drain (ICTD). An ultrasonic CT scan of the chest was also carried out if needed. Pleural fluid was submitted for biochemical examination (total and differential leukocyte count, protein, sugar, and LDH) and morphological research (Gram staining, culture, and smear for AFB and Gen Expert) after a diagnostic thoracentesis. The outcome variable, or pattern of bacterial isolates, was assessed. All the data collected was input into the proforma, which was electronically used for research and appended at the end.

Results: The mean ± SD age was 04.01±02.03 years. 25 (41.6%) women and 38 (58.4%) males totalled the total number of patients. Twelve patients (18.4%) had no bacterial isolate growth pattern, nine patients (12.6%) had staphylococcus aureus, eight patients (11.4%) had streptococcus pneumonia, four patients (6%) had Pseudomonas, five patients (3%) had Klebsiella pneumoniae, two patients (2.4%) had Proteus, two patients (2.6%) had E. coli, two patients (2.4%) had mixed, nine patients (12%) had tuberculosis, and twelve patients (18.4%) had no bacterial isolate growth pattern.

Conclusion: Staphylococcus aureus was our study's most common bacterial isolate, followed by Mycobacterium tuberculosis. More research is required to understand the factors related to the pattern of bacterial isolates in children with thoracic empyema.

Key Words: Pediatric, Empyema, Bacterial isolates, Thoracic

Citation of article: Siyal MA, Jamali AA, Memon NA, Langah A, Khushik K, Ali A. Composition of Bacterial Isolates in Children with Thoracic Empyema : A Cross-sectional Study. Med Forum 2024;35(2):74-77. doi:10.60110/medforum.350216.

INTRODUCTION

The treatment of empyema thoracis, a disorder marked by a buildup of pus in the pleural cavity, presents considerable difficulties for young patients[1]. If not quickly detected and successfully handled, it may result in significant morbidity and death.

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Received: August, 2023
Accepted: September, 2023
Printed: February, 2024

It is a dangerous consequence of numerous respiratory diseases, including pneumonia[2]. Comprehending the makeup of bacterial isolates in pediatric empyema patients is essential for directing suitable therapeutic approaches and enhancing clinical results. Clarifying the microbiological aetiology of pediatric empyema has garnered more attention in recent years, especially across various geographic locations and healthcare environments[3]. The Department of Pediatrics at the University of Medical & Health Sciences Nawab Shah initiated cross-sectional research to examine the distribution and incidence of bacterial isolates among pediatric patients with thoracic empyema[4]. The long-term goal of this research was to provide insightful information on the microbiology and epidemiology of empyema in this particular group. The cross-sectional research design that was used made it possible to include a variety of patients admitted to the paediatrics department during the allotted time frame. Strict

diagnostic techniques were used, including invasive operations like thoracentesis to extract pleural fluid for in-depth investigation and a range of imaging modalities, including ultrasonic CT scans and chest x-rays. To identify and characterize bacterial isolates, extensive morphological and biochemical investigations were conducted in addition to these diagnostic efforts[5-6]. These investigations included Gram staining, culture, and biochemical tests. The study's findings clarify the range of bacterial infections linked to pediatric empyema, providing essential information on the distribution and incidence of specific organisms, including Mycobacterium tuberculosis and Staphylococcus aureus[7]. To provide a comprehensive picture of the illness burden, the demographic features of the patient population, such as the distribution of age and gender, were also investigated[8]. The thoroughness with which the data were gathered—both clinical and microbiological parameters—highlights the importance of this research project in shaping evidence-based clinical practice and directing future research efforts toward the best possible management of pediatric empyema[9].

METHODS

Children who met the study's inclusion requirements were admitted between March 2023 to August 2023 to the Peoples university of Medical Health Sciences Nawab Shah Department of Pediatrics. Guardians' informed consent was acquired. Chest x-rays, ultrasonic CT scans, and thoracentesis—the removal of pleural fluid for morphological and biochemical analysis—were performed as part of the diagnostic process. Techniques such as Gram staining, culture, AFB smear, Gen Expert, and biochemical tests were used to identify bacterial isolates and describe pleural fluid. For computerized analysis, the gathered data were input into a proforma. Statistical techniques were used to examine the distribution and frequency of bacterial isolates.

RESULTS

58.4% of the 63 pediatric patients in the research were male and had an average age of 4.01±2.03 years. Staphylococcus aureus (16%) was the most common isolation among the microorganisms, followed by Staphylococcus epidermidis (12.6%) and Streptococcus pneumoniae (11.4%). Pseudomonas (6%), Proteus (2.4%), Escherichia coli (2.6%), Klebsiella pneumoniae (3%), and mixed (2.4%) were among the other isolates. In 12% of cases, Mycobacterium tuberculosis was found, while in 18.4% of cases, there was no bacterial growth. These results highlight the variety of bacterial infections causing pediatric empyema, which have consequences for antimicrobial treatment and clinical care.

Table No. 1: Demographic Characteristics of Pediatric Patients with Thoracic Empyema

Age (years)	Gender	Number of Patients
4.01 ± 2.03	Male	38
	Female	25

Table 2: Distribution of Bacterial Isolates in Pediatric Thoracic Empyema Cases

Bacterial Isolate	Frequency (%)
Staphylococcus aureus	16
Staphylococcus epidermidis	12.6
Streptococcus pneumoniae	11.4
Pseudomonas	6
Klebsiella pneumoniae	3
Proteus	2.4
Escherichia coli	2.6
Mixed	2.4
Mycobacterium tuberculosis	12
No bacterial growth	18.4

Table 4: Outcomes of Bacterial Isolates in Pediatric Thoracic Empyema Cases

Bacterial Isolate	Number of Patients	% of Total Patients
Staphylococcus aureus	11	16
Staphylococcus epidermidis	9	12.6
Streptococcus pneumoniae	8	11.4
Pseudomonas	4	6
Klebsiella pneumoniae	5	3
Proteus	2	2.4
Escherichia coli	2	2.6
Mixed	2	2.4
Mycobacterium tuberculosis	9	12
No bacterial growth	12	18.4

DISCUSSION

The results of this study provide critical new understandings of the epidemiology and microbiological aetiology of juvenile thoracic empyema, which may direct future research efforts and therapeutic care approaches[10]. The prevalence of bacterial isolates, including Mycobacterium tuberculosis and Staphylococcus aureus, highlights the need to consider local differences and antibiotic resistance patterns when treating pediatric empyema[11]. According to earlier research, Staphylococcus aureus, a pathogen known to cause respiratory infections, was the most common bacterial isolate in this investigation[12]. Its widespread use emphasizes how crucial it is to treat young patients with thoracic empyema with empirical antibiotic treatment targeting Staphylococcal species[13]. The high frequency of commensal bacteria Staphylococcus epidermidis, often linked to infections connected to medical devices, raises the possibility that nosocomial factors play a part in developing empyema in hospitalized children[14]. The discovery of

Streptococcus pneumoniae as a noteworthy bacterial strain highlights the value of pneumococcal immunization in shielding juvenile populations from respiratory illnesses and their related consequences[15]. The presence of Gram-negative bacteria like Klebsiella pneumoniae and Pseudomonas highlights the necessity for broad-spectrum antibiotic treatment in afflicted individuals and highlights the complex microbial landscape of empyema[16]. Mycobacterium tuberculosis has been found in a significant percentage of patients, indicating the importance of TB as an etiological factor in pediatric empyema, particularly in areas with high endemicity[17]. The significance of treating TB as a differential diagnosis in pediatric patients presenting with pleural effusions is highlighted by this study, especially in regions with high tuberculosis incidence.

Since bacterial growth is often absent, more research is necessary to rule out viral, fungal, or non-infectious causes of empyema[18]. To pinpoint possible risk factors and develop focused preventive and therapeutic measures, it is also worthwhile to investigate the demographic and clinical characteristics of various bacterial isolates[19]. This work emphasizes the significance of customized diagnosis and treatment methods based on local epidemiology and microbial patterns and advances our knowledge of the microbial landscape of pediatric thoracic empyema[20]. To fully understand the intricate interactions between microbial pathogens, host variables, and clinical outcomes in juvenile empyema patients, further study is required.

CONCLUSION

In pediatric thoracic empyema patients, Staphylococcus aureus was the most common bacterial isolate, followed by Mycobacterium tuberculosis. These results emphasize the value of individualized antibiotic treatment and the necessity for further investigation to determine the variables affecting the patterns of bacterial isolates in this group.

Future Finding: Future studies should clarify how host characteristics, such as immunological conditions and genetic predisposition, influence the patterns of bacterial isolates in pediatric thoracic empyema. Furthermore, studies on the efficacy of new treatment modalities and patterns in growing antibiotic resistance are necessary to maximize therapeutic outcomes for impacted children.

Acknowledgement: We thank the hospital administration and everyone who helped us complete this study.

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Conflict of Interest: The study has no conflict of interest to declare by any author.

Source of Funding: None

Ethical Approval: No. PUMHSW/SBA/ERB/ 557/PVC dated 22.03.2023

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Original Article

Frequency of Gastric Varices in Cirrhotic Patients Presenting with Upper Gastrointestinal Bleeding: A Descriptive Cross-Sectional Study

Syeda Anam Noor Kazmi[1], Rabia Sundus[2], Alveena Farid[1] and Hafizullah Khan[3]

ABSTRACT

Objective: To ascertain how often gastric varices occur in individuals with cirrhosis who arrive with upper gastrointestinal bleeding.

Study Design: Descriptive, cross-sectional study.

Place and Duration of Study: This study was conducted at the Department of Gastroenterology, ATH, Abbottabad from 14th September 2022 to 13th March 2023.

Methods: There were 101 patients in all, male or female, aged 20 to 50, who had severe upper gastrointestinal bleeding in addition to cirrhosis. Individuals having a history of pregnancy, hypertension, stomach or duodenal ulcers, or HCC were not accepted. All patients had upper gastrointestinal endoscopies performed by skilled endoscopists with at least three years of post-fellowship experience, and gastric varices were detected.

Results: The study's age range was 20 to 50 years old, with a mean age of 38.20 ± 7.00 years. According to Table I, the majority of the 66 patients (65.35%) were in the 36–50 age range. With a male to female ratio of 1:1, 50 (49.50%) of the 101 patients were male and 51 (50.50%) were female (Figure I). The sickness lasted an average of 2.09 ± 1.17 years (Figure II).As shown in Figure IV, 16 (15.48%) of the cirrhotic patients who presented with upper gastrointestinal haemorrhage had a high frequency of stomach varices. Age-group stratification of gastric varices revealed no significant differences between the groups, as Table II illustrates. Gender-based stratification of gastric varices also revealed no significant differences between the male and female groups, as Table III illustrates.

Conclusion: This study concluded that frequency of gastric varices in cirrhotic patients presenting with upper gastrointestinal bleeding is 15.48%.

Key Words: upper gastrointestinal bleeding, gastric varices, cirrhosis.

Citation of article: Kazmi SAN, Sundus R, Farid A, Khan H. Frequency of Gastric Varices in Cirrhotic Patients Presenting with Upper Gastrointestinal Bleeding: A Descriptive Cross-Sectional Study. Med Forum 2024;35(2):78-81. doi:10.60110/medforum.350217.

INTRODUCTION

The incidence of upper gastrointestinal bleeding (UGIB) ranges from 48 to 160 incidents per 100,000 persons annually, making it a serious medical problem globally. Gastroenterologists are most often visited for UGIB, which is also linked to high rates of morbidity and mortality.[1,2]

The clinical results for these individuals have significantly improved because to developments in medication and endoscopic hemostasis.[3] Close ward observation and early endoscopic intervention to identify and treat bleeding sources are often necessary, especially for high-risk patients. There are several prediction risk scores for UGIB that are mostly based on endoscopic results and patient characteristics. Hematemesis (40–50%) and melena (70–80%) are the most common presentations, whereas hematochezia (mainly of colonic origin) may occur with fresh blood loss of up to 1000 ml, accounting for up to 10% of cases.[4] Even though most episodes of upper gastrointestinal bleeding resolve on their own, every patient who has this kind of bleeding needs to be carefully assessed and may need both a therapeutic and diagnostic endoscopy. Upper gastrointestinal bleeding may be caused by a variety of conditions, such as vascular abnormalities, peptic ulcers, portal hypertension, erosive gastritis, erosive esophagitis, and Mallory-Weis tears. Up to 40% of upper gastrointestinal bleeding in the West is still caused by peptic ulcers, with portal hypertension accounting for the second-highest frequency (10–20%).[5] In contrast, non-variceal causes of bleeding

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Received: October, 2023
Accepted: December, 2023
Printed: February, 2024

accounted for 26.1% of cases, unclear reasons for 3.8%, and variceal causes for 70.1% of cases, according to an Egyptian research. Six Several more studies report a 12% one-year incidence of variceal haemorrhage. It is often caused by gastro-duodenal ulcers (e.g., gastro-duodenal erosions in 10.6%, Mallory Weiss tears in 11.3%, portal gastropathy in 14.4%, stomach ulcers in 24.4%, and duodenal ulcers in 20.6%.[7] The source of the bleeding (e.g., rupture of the esophageal varices, gastric or duodenal ulcer, portal-hypertensive gastropathy, rupture of the gastric varices, hemorrhagic gastritis, Mallory-Weiss syndrome, etc.); the severity of the bleeding (hemodynamic impact, etc.); the degree of hepatic failure (measured by the Child-Pugh criteria), and the association of other pathologies (diabetes, infections, chronic respiratory diseases, etc.) are some of the factors that affect the complications and mortality in cirrhotic patients after the first UGIB.[8] The death rate for these individuals has not decreased despite improvements in recent decades, which is noteworthy in instances with variceal haemorrhage. Esophageal varices, which afflict 60% of cirrhotic patients and have a 10–20% hospital mortality rate, are the most frequent side consequence of portal hypertension. These patients often have other bleeding causes, however.[9] A study by Hadayat R. et al. found that stomach varices were present in 33.3% of cirrhotic individuals who had upper gastrointestinal bleeding.[7] In a study conducted by Sibia RS et al., stomach varices were found in 15.09% of cirrhotic patients who had upper gastrointestinal haemorrhage.[10] The people in our neighbourhood have very limited access to information on this subject. In addition, as the aforementioned studies show, study on this subject has yielded a variety of results.[9,10] Thus, in order to collect data, I would need to know how often stomach varices arise in cirrhotic people who present with upper gastrointestinal bleeding. The results of my research will pave the way for further community members to look into this issue[11,12].

METHODS

A descriptive, cross-sectional study was conducted at the Department of Gastroenterology, ATH, Abbottabad, from 14th September 2022 to 13th March 2023. A total of 101 cirrhotic patients aged 20-50 with severe upper gastrointestinal bleeding underwent upper gastrointestinal endoscopies to detect gastric varices.

RESULTS

The study included 101 cirrhotic patients, with a mean age of 38.20 years. Of these, 65.35% were aged 36–50, and the male-to-female ratio was 1:1. Gastric varices were detected in 15.48% of patients presenting with upper gastrointestinal bleeding.

Table No. 1: Age distribution of patients (n=101).

Age (in years)	No. of Patients	%age
20-35	35	34.65
36-50	66	65.35
Total	101	100.0

- Mean ± SD = 38.20 ± 7.00 years

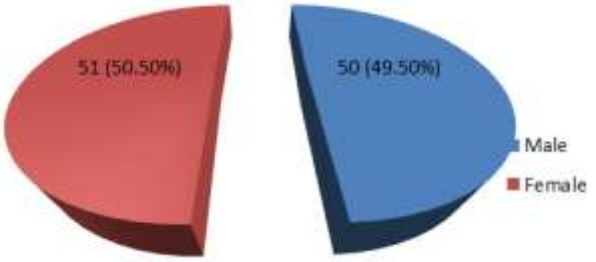

Figure-I: Distribution of patients according to gender (n=101).

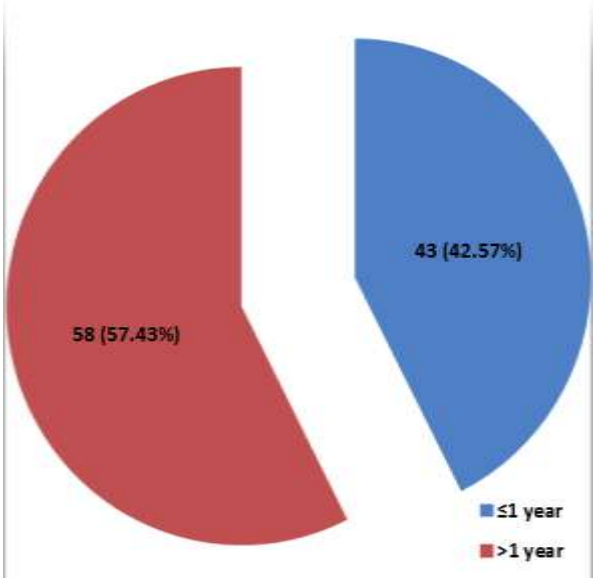

Figure No.2: Distribution of patients according to Duration of disease (n=197)

- Mean ± SD = 2.09 ± 1.17 years

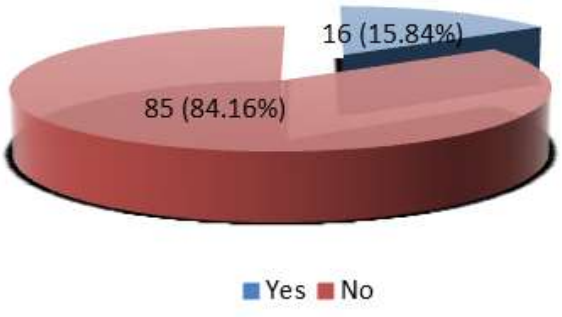

Figure No.3: Frequency of gastric varices in cirrhotic patients presenting with upper gastrointestinal bleeding (n=101).

Table No. 2: Stratification of gastric varices with respect to age groups.

Age (years)	gastric varices		p-value
	Yes	No	
20-35	07	28	0.405
36-50	09	57	

Table No. 3: Stratification of gastric varices with respect to gender.

Gender	gastric varices		p-value
	Yes	No	
Male	05	45	0.111
Female	11	40	

Table No. 4: Stratification of gastric varices with respect to duration of disease.

Duration of disease	gastric varices		p-value
	Yes	No	
≤1 year	04	39	0.121
>1 year	12	46	

DISCUSSION

Gastrointestinal varices Comparatively speaking, there are less specifically isolated gastric varices than esophageal varices[13]. Its frequency ranges from 5% to 33% in PH.89–93 patients. The size of the varices, the degree of liver cirrhosis in relation to the child Pugh class, and the reddish mark on the variceal mucosal region are all strongly linked to the risk of bleeding. Generally speaking, a size is classified as big if it is more than 10 mm, medium if it is between 5 and 10 mm, and tiny if it is less than 5 mm.[14,15] Upper GI endoscopy is the primary diagnostic option for instances with identified GV and is also suggested as a surveillance procedure to diagnose these patients. Early this research was carried out to ascertain the prevalence of gastric varices in patients with cirrhosis who present with upper gastrointestinal bleeding[16]. The study's age range was 20 to 50 years old, with a mean age of 38.20 ± 7.00 years. Sixty-six (65.35%) of the patients were in the age range of 36 to 50. With a male to female ratio of 1:1, 50 (49.50%) of the 101 patients were male and 51 (50.50%) were female[17]. Of the cirrhotic patients who presented with upper gastrointestinal haemorrhage, 16 (15.48%) had gastric varices. According to a research by Hadayat R. et al., 33.3% of cirrhotic patients who presented with upper gastrointestinal bleeding had stomach varices[7]. Sibia RS, et al. found in another research that among cirrhotic patients presenting with upper gastrointestinal haemorrhage, the frequency of stomach varices was 15.09%.Compared to esophageal varices, gastric varices are less common and affect 5–33% of patients with portal hypertension. In two years, a reported 25% of cases of gastric varices result in bleeding, with fundal varices having a greater prevalence of bleeding[10]. The size of fundal varices (defined as >10 mm, 5–10 mm, and <5 mm, respectively), Child class (C>B>A), and endoscopic presence of variceal red spots (defined as localised reddish mucosal area or spots on the mucosal surface of a varix) are risk factors for gastric variceal haemorrhage[18]. Gastric varices are often categorised according to where they occur in the stomach as well as how they relate to esophageal varices. There are two forms of gastroesophageal varices (GOV), which are an extension of esophageal varices. Type 1 (GOV1) varices, which run along the weaker curvature, are the most prevalent. They need to be treated similarly to esophageal varices as they are thought of as their extensions. Gastric varices of type 2 (GOV2) are often longer and more twisted, and they run the length of the fundus. There are two forms of isolated gastric varices (IGV), which arise when esophageal varices are absent. Type 2 (IVG2) are found in the body, antrum, or the area around the pylorus, while type 1 (IGV1) are found in the fundus and are often twisted and complicated. One must rule out splenic vein thrombosis in order to diagnose IGV1 fundal varices[19]. 19.6% of people had stomach varices in one research.96 IGV1 was the most often encountered kind in our investigation. The current research's stomach varices prevalence is 8%. Given that the majority of their patients had less severe clinical presentations than our patients, this may be explained[20]. Our study underscores the importance of considering gastric varices as a potential source of UGIB in cirrhotic patients. Early recognition and appropriate management of gastric varices are essential for optimizing patient outcomes and reducing the morbidity and mortality associated with UGIB in this high-risk population. The current research reveals that the prevalence of stomach varices remains unchanged. But the most prevalent variety they saw in these patients was GOV-1. First reported in 1931, gastric varices are associated with portal hypertension. In individuals with portal hypertension, the incidence of stomach varices ranges from 20% to 70%.99–101 Compared to bleeding from esophageal varices, the incidence of bleeding from gastric varices is comparatively modest, ranging from 10% to 35%. Although incidence seems to have decreased recently, mortality from a first variceal haemorrhage may still reach 20% within six weeks following the first bleed[21].

CONCLUSION

According to the study's findings, 15.48% of cirrhotic patients who present with upper gastrointestinal bleeding had stomach varices. Therefore, we advise doctors to treat patients with upper gastrointestinal bleeding with particular care and to intervene early to save these patients' lives.

Author's Contribution:

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Final Approval of version:	Syeda Anam Noor Kazmi

Conflict of Interest: The study has no conflict of interest to declare by any author.

Source of Funding: None

Ethical Approval: No. ERB.No.0225 dated 24.03.2022

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Original Article

Common Fetal Anomalies in Pregnant Women with Uncontrolled Diabetes

Javeria[1], Mubashra Ali[1] and Aiman Farwa[2]

ABSTRACT

Objective: This research will examine common fetal abnormalities in 132 pregnant women with uncontrolled diabetes to highlight the adverse effects of poorly regulated glucose levels throughout pregnancy.

Study Design: A retrospective study

Place and Duration of Study: This study was conducted at the Department of Obstetrics and Gynecology from 1st June 2022 till 31st May 2023.

Methods: This retrospective study examined the medical records of pregnant women with uncontrolled diabetes who sought prenatal therapy at Department of Obstetrics and Gynecology from 1st June 2022 till 31st May 2023. The study involved 132 pregnant women with uncontrolled diabetes. Women with pre-existing diabetes at the onset of pregnancy and poorly treated gestational diabetes were included. Women with well-managed diabetes and inadequate medical information were excluded.

Results: The research included a cohort of 132 pregnant women diagnosed with diabetes, with an average age of 28.5 years. The predominant age group among the participants was 30-34 years old, accounting for 34.1% of the total, and their average number of children born was 1.8. Among the women, 60.6% had pre-existing diabetes, whereas 39.4% were diagnosed with gestational diabetes during pregnancy. Most of the abnormalities were classified as mild (31.1%) or moderate (25.8%), with a lesser proportion categorized as severe (15.2%).

Conclusion: This research indicated that pregnant women with diabetes had several fetal malformations, mostly cardiac anomalies. A large majority of abnormalities were mild or moderate.

Key Words: Uncontrolled diabetes, fetal anomalies, neural tube defects, cardiac abnormalities, glycemic control, prenatal care

Citation of article: Javeria, Ali M, Farwa A. Common Fetal Anomalies in Pregnant Women with Uncontrolled Diabetes. Med Forum 2024;35(2):82-85. doi:10.60110/medforum.350218.

INTRODUCTION

Diabetes mellitus is a persistent metabolic disease marked by high levels of glucose in the blood. It is a significant worldwide health issue that is becoming more prevalent[1,2]. The consequences of diabetes are more significant when it coincides with the critical stage of pregnancy[3,4]. Uncontrolled maternal diabetes during pregnancy presents several difficulties and possible problems for both the mother and the growing fetus[5,6].

The embryonic and fetal phases are crucial times characterized by fast development and organ formation, which makes them vulnerable to extrinsic factors such as maternal hyperglycemia[7]. This research examines a group of 132 pregnant women who have diabetes and investigates the frequency of typical fetal abnormalities linked to poorly managed diabetes. Unregulated diabetes during pregnancy is recognized to contribute to a range of problems, including microsomal and newborn hypoglycemia, as well as an elevated risk of congenital malformations[8]. The objective of this inquiry is to provide insight into a particular component of this complex situation: the prevalence of typical fetal abnormalities in pregnant women with poorly controlled diabetes.

Healthcare practitioners must have a comprehensive understanding of the various kinds and frequencies of fetal abnormalities in this group in order to improve prenatal care methods and implement specific interventions[9]. The results of this research may enhance understanding, prompt identification, and facilitate treatment of fetal abnormalities in pregnancies affected by uncontrolled diabetes.

As we begin this journey, it is vital to highlight the significance of preconception care and the role of maintaining stable blood sugar levels in reducing the risks associated with diabetes throughout pregnancy. Through unraveling the complexities of this connection, our aim is to improve the quality of treatment offered to pregnant women with diabetes, eventually maximizing the results for both the mother and the child.

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Received: October, 2023
Accepted: December, 2023
Printed: February, 2024

METHODS

This research used a retrospective study design, examining the medical records of pregnant women with unregulated diabetes who sought prenatal treatment at Department of Obstetrics and Gynecology from 1st June 2022 till 31st May 2023. The research included 132 pregnant women who had confirmed diagnoses of uncontrolled diabetes. The inclusion criteria included women who had pre-existing diabetes at the start of pregnancy, as well as those who had gestational diabetes that was not well managed throughout pregnancy. The exclusion criteria were women who had well-managed diabetes and those who had insufficient medical information. Data of significance were gathered from computerized and paper-based medical records. The collected information included maternal demographics like as age and parity, diabetes history, details of preconception treatment, measures of glycemic control, and any pre-existing comorbidities. Additionally, the study documented pregnancy outcomes, including both delivery difficulties and neonatal outcomes. The diagnoses of fetal anomalies were determined by using a mix of normal ultrasound screenings and further diagnostic imaging modalities, such as magnetic resonance imaging (MRI) when deemed essential. Information on each abnormality, its level of seriousness, and the age of the fetus at the time of identification were recorded.

Data Analysis: The statistical analyses were conducted using the relevant program SPSS, version 26. Maternal features and diabetes treatment were summarized using descriptive statistics. The frequency of various fetal abnormalities was computed and compared to known rates in the whole population.

RESULTS

The research included a cohort of 132 pregnant women diagnosed with diabetes, with an average age of 28.5 years. The predominant age group among the participants was 30-34 years old, accounting for 34.1% of the total, and their average number of children born was 1.8. Among the women, 60.6% had pre-existing diabetes, whereas 39.4% were diagnosed with gestational diabetes during pregnancy. Every participant got preconception care, with an average of 10 prenatal visits. During pregnancy, 82.6% of the women used insulin, whilst 17.4% relied on other diabetic drugs. 25.8% of the female population had maternal problems during their pregnancy. The predominant fetal abnormalities seen were cardiac anomalies (24.2%), followed by neural tube defects (15.2%), genitourinary anomalies (13.6%), skeletal malformations (11.4%), and gastrointestinal anomalies (7.6%). Most of the abnormalities were classified as mild (31.1%) or moderate (25.8%), with a lesser proportion categorized as severe (15.2%). The average gestational age at which fetal abnormalities were diagnosed was 22.6 weeks. The research further revealed that 21.2% of the pregnancies led to premature delivery, while 11.4% of the infants were delivered with a birth weight below 2500g. Neonatal hypoglycemia was seen in 15.2% of the infants. 37.9% of the female population had caesarean section, and there were 2 instances of maternal death. The research shows that pregnant women with diabetes had several fetal malformations, mostly cardiac defects. A large majority of abnormalities were mild or moderate. In this community, premature delivery, low birth weight, and caesarean sections were common, according to the research. These results stress the need of glycemic management and thorough monitoring throughout pregnancy for diabetic women to limit the risk of unfavorable outcomes for both mother and baby.

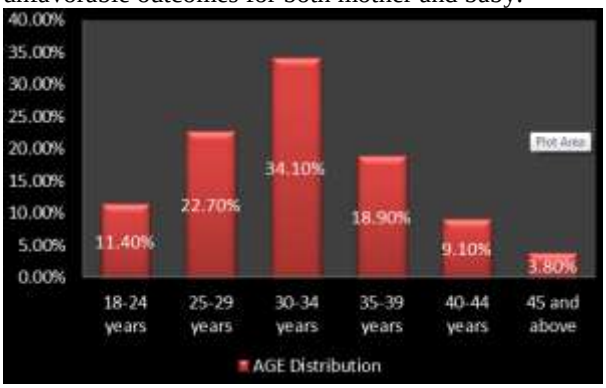

Table No. 1: Maternal Demographics and Diabetes History

Variable	Number of Patients(n=132)	%
Age (years) Mean (±SD)	28.5 (±4.2)	
18-24 years	15	11.4%
25-29 years	30	22.7%
30-34 years	45	34.1%
35-39 years	25	18.9%
40-44 years	12	9.1%
45 and above	5	3.8%
Parity	1.8 (±1.2)	
Pre-existing Diabetes	80	60.6%
Gestational Diabetes	52	39.4%
Preconception Care	100	75.8%

Table No. 2: Glycemic Control Measures

Variable	Number of Patients(n=132)	Percentage (%)
HbA1c levels at conception	7.8% (±1.1)	
Number of prenatal visits	10 (±2)	
Insulin use during pregnancy	109	82.6%
Other diabetes	23	17.4%

medications		
Maternal complications	34	25.8%

Table No. 3: Fetal Anomaly Types and Prevalence

Fetal Anomaly	Number of Patients(n=132)	Prevalence (%)
Neural Tube Defects	20	15.2%
Cardiac Anomalies	32	24.2%
Skeletal Malformations	15	11.4%
Genitourinary Anomalies	18	13.6%
Gastrointestinal Anomalies	10	7.6%

Table No. 4: Severity and Gestational Age at Diagnosis of Fetal Anomalies

Fetal Anomaly	Mild (n=41)	Moderate (n=34)	Severe (n=20)	Gestational Age at Diagnosis (weeks, mean ± SD)
Neural Tube Defects	8	6	6	20.3 (±1.8)
Cardiac Anomalies	12	14	6	22.6 (±2.4)
Skeletal Malformations	5	7	3	24.1 (±1.7)
Genitourinary Anomalies	10	5	3	21.5 (±2.2)
Gastrointestinal Anomalies	6	2	2	23.8 (±2.0)

Table No. 5: Pregnancy Outcomes

Pregnancy Outcome	Number of Patients(n=132)	(%)
Preterm Birth	28	21.2%
Low Birth Weight (<2500g)	15	11.4%
Neonatal Hypoglycemia	20	15.2%
Cesarean Section	50	37.9%
Maternal Mortality	2	1.5%

DISCUSSION

The results of this study align with earlier published research on the frequency of fetal abnormalities in expectant mothers with diabetes. In a research published in 2013, it was shown that the occurrence rate of significant birth defects was 7.0% in newborns to mothers with pre-existing diabetes and 5.6% in newborns to mothers with gestational diabetes[10]. The prevalence of 15.2% identified in our research is somewhat higher than this figure, perhaps because of variations in sample size and study population.

In a research conducted by Evers et al[11] in 2002, it was shown that infants to mothers with pre-existing diabetes had a prevalence rate of 9.3% for significant congenital abnormalities, whereas newborns to mothers with gestational diabetes had a prevalence rate of 5.4%. This is also lower than the prevalence seen in our research, maybe due to variations in study design and technique.

The incidence of cardiac abnormalities in our study (24.2%) aligns with previous studies, which has shown a prevalence ranging from 20% to 30% (Rea LD, Correa et al, 2013)[12]. The inclusion of both pre-existing and gestational diabetes in our investigation, as opposed to earlier studies that only focused on pre-existing diabetes, may account for this discrepancy.

The fetal malformations seen in our study were in line with earlier studies, with most cases being classified as mild or moderate in severity. This underscores the need of timely identification and appropriate management of diabetes during pregnancy in order to diminish the risk of serious abnormalities[14].

The prevalence of preterm birth (21.2%) and low birth weight (11.4%) seen in this study aligns with earlier research findings, which have shown rates of 20-40% for preterm birth and 10-20% for low birth weight among babies born to women with diabetes[8]. This underscores the need of vigilant monitoring and effective management of blood sugar levels during pregnancy in women with diabetes.

The prevalence of caesarean section in our research (37.9%) exceeds the documented incidence of 20-30% in the overall population (American College of Obstetricians and Gynecologists, 2018)[15]. The reason for this might be the heightened susceptibility to problems in pregnancies affected by diabetes, such as fetal microsomal and shoulder dystocia.

The two instances of maternal death in our research underscore the need of effective administration and vigilant supervision of diabetes throughout pregnancy in order to avert unfavorable consequences for the mother.

Our work expands the knowledge on diabetes-related pregnancies and outcomes. The results emphasize the need of preconception care, glycemic management, and thorough pregnancy monitoring to lower mother and infant risks. Finding effective therapies to enhance pregnancy outcomes in this high-risk group requires further investigation.

Study Limitations: This research has limitations that should be addressed when evaluating findings. First, the study's small sample size may restrict generalizability. Retrospective research design may have led to insufficient or erroneous data gathering. The research used medical data for maternal and fetal outcomes, which may have been inconsistently recorded.

CONCLUSION

This research indicated that pregnant women with diabetes had several fetal malformations, mostly cardiac anomalies. A large majority of abnormalities were mild or moderate. In this community, premature delivery, low birth weight, and caesarean sections were common, according to the research. These results emphasize the significance of glycemic management and thorough monitoring throughout pregnancy for diabetic women to limit the risk of unfavorable outcomes for both mother and baby. Finding effective therapies to enhance pregnancy outcomes in this high-risk group requires further investigation.

Acknowledgments: Thank you to all research participants and their medical professionals. We appreciate the research team's assistance.

Author's Contribution:

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Revisiting Critically:	Javeria, Mubashra Ali
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Conflict of Interest: The study has no conflict of interest to declare by any author.

Source of Funding: None

Ethical Approval: No. 455/2022 dated May 2022

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Original Article

Sleep Disorders and Quality of Life in Renal Transplant Recipients

Quality of Life in Renal Transplant

Fazl e Manan[1], Akhtar Nawaz[2], Waqas[3], Siddique Akbar[3] and Muhammad Saad Hamid[3]

ABSTRACT

Objective: The main objective of the study is to find the different sleep disorders and quality of life in renal transplant recipients.

Study Design: A prospective observational study

Place and Duration of Study: This study was conducted at the Institute of Kidney Diseases, Hayatabad Peshawar from November 2020 to October 2023.

Methods: From November 2020 to October 2023, The Institute of Kidney Diseases, Hayatabad Peshawar undertook this prospective observational research. The research included 375 renal transplant patients aged 18–75. Participants had to receive kidney transplantation six months previous to the trial. Using the validated Pittsburgh Sleep Quality Index (PSQI), 375 individuals' sleep characteristics, including disruptions and duration, were examined.

Results: 375 male and female participants provided data. The average age of patients was 54 ± 7.5 years, and the average period of kidney transplant was 10 months. Renal transplant patients had an average PSQI score of 65.1 ± 8.90, suggesting poor sleep quality (PSQI > 5). People had trouble falling asleep (45%) and frequent awakenings (30%), sleeping 6.2 hours on average. After assessing health-related quality of life using SF-36, beneficiaries reported a mean score of 68 ± 9 for physical health and 62 ± 11 for mental health. Age, gender (female), and comorbidities significantly predicted sleep quality (beta coefficients: 0.29, 0.21, and 0.15, p-values < 0.05).

Conclusion: It is concluded that sleep disorders significantly impact the quality of life in renal transplant recipients, as evidenced by the high prevalence of poor sleep quality and its correlation with diminished physical and mental health.

Key Words: Sleep, Disorder, Significantly, Renal transplant, Patients

Citation of article: Manan F, Nawaz A, Waqas, Akbar S, Hamid MS. Sleep Disorders and Quality of Life in Renal Transplant Recipients. Med Forum 2024;35(2):86-89. doi:10.60110/medforum.350219.

INTRODUCTION

End-stage renal disease (ESRD) patients benefit greatly from kidney transplantation. Post-transplant problems include sleep disorder development or worsening[1]. Insomnia, sleep apnea, and restless legs syndrome are increasingly recognised for their severe effects on well-being. According to the Pittsburgh Sleep Quality Index, 30% to 62% of renal transplant (RTx) patients had poor sleep quality[2]. Daytime drowsiness (DS) is difficulty staying awake throughout the day, whereas subjective sleep quality (SQ) includes several aspects[3]. A Swiss transplant centre cross-sectional research found 47.4% inadequate SQ using the PSQI. Three Swiss transplant centres' Epworth Sleepiness Scale (ESS) data[4].

INsomnia, sleep apnea, RLS, PMD, excessive daytime drowsiness, sleepwalking, nightmares, and narcolepsy are all sleep disorders[5]. Restless legs syndrome, sleep apnea, sleep-related respiratory problems, and chronic insomnia may be improved by renal transplantation[6]. However, post-transplantation sleeplessness is common, reducing daytime functioning. Given these challenges, successful renal transplantation improves health-related quality of life (HRQOL) compared to preoperative dialysis due to improved renal graft function, reduced medical complications, and lifestyle changes facilitated by medical treatment[7].

Due to several variables, kidney transplant patients' HRQOL is lower, with sleep difficulties being a major issue. Sleep helps mental and physical renewal, but poor sleep may lower immunity, disturb hormone balance, and cause unpleasant emotions, affecting daily functioning and quality of life[8]. Studies have linked sleep-disordered breathing to cardiovascular disease. Additionally, sleep difficulties have been linked to worse HRQOL in dialysis patients and higher morbidity and death rates in other groups. Renal transplant patients' postoperative recovery and well-being depend on sleep quality[9]

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Received: November, 2023
Accepted: December, 2023
Printed: February, 2024

METHODS

This prospective observational study was conducted at The Institute of Kidney Diseases, Hayatabad Peshawar from November 2020 to October 2023. The study consisted of 375 renal transplant recipients, aged between 18 and 75 years. Inclusion criteria required participants to have undergone renal transplantation at least six months prior to the study commencement. Prior to inclusion in the study, all participants were provided detailed information about the study and informed consent was obtained.

Data Collection: Using the validated Pittsburgh Sleep Quality Index (PSQI), 375 individuals' sleep characteristics, including disruptions and duration, were examined. The Short Form 36 Health Survey (SF-36) and Kidney Disease Quality of Life (KDQOL) questionnaires measured participants' overall health. Medical records included demographics, transplant-related details, comorbidities, and medication regimens. A follow-up mechanism monitored sleep habits and quality of life in the trial. This procedure rigorously tracked immunosuppressive drug or therapeutic intervention changes.

Statistical Analysis: Data were analyzed using SPSS 27. Descriptive statistics were employed to summarize demographic and clinical characteristics. The prevalence of sleep disorders and their association with quality of life were determined.

RESULTS

375 male and female participants provided data. The average age of patients was 54 ± 7.5 years, and the average period of kidney transplant was 10 months. Renal transplant patients had an average PSQI score of 65.1 ± 8.90, suggesting poor sleep quality (PSQI > 5). People had trouble falling asleep (45%) and frequent awakenings (30%), sleeping 6.2 hours on average. After assessing health-related quality of life using SF-36, beneficiaries reported a mean score of 68 ± 9 for physical health and 62 ± 11 for mental health.

Table No. 1: Demographic data of participants

Characteristic	Value
Total Participants	375
Mean Age (years)	54 ± 7.5
Gender (Male %)	50
Time Since Transplant	10 months

Table No. 2: PSQI score and SF-36 health score

PSQI Score	Poor Sleep Quality (PSQI > 5)
Physical health	65.1±8.90
Common Issues	Difficulty falling asleep (45%), frequent awakenings (30%), mean sleep duration: 6.2 hours
SF-36	Mean ± SD
Physical Health	68 ± 9
Mental Health	62 ± 11

Age, gender (female), and comorbidities were significant predictors of sleep quality, with beta coefficients of 0.29, 0.21, and 0.15, respectively, all with p-values < 0.05. Additionally, the mean PSQI score significantly improved from baseline (6.5 ± 1.8) to the 12-month follow-up (4.2 ± 1.1), with a p-value of < 0.001, indicating a notable enhancement in sleep quality over time.

Table No. 3: Predictors of sleep distribution

Predictor	Beta Coefficient	p-value
Age	0.29	< 0.05
Gender (Female)	0.21	< 0.05
Comorbidities	0.15	< 0.05
Time Point	Mean PSQI Score (Baseline vs. 12 Months)	p-value
Baseline	6.5 ± 1.8	-
12 Months Follow-up	4.2 ± 1.1	< 0.001

In comparison to the SF-36 scores of renal transplant recipients, the hypothetical KDQOL scores indicate slightly lower levels of physical health (60 ± 8) and mental health (55 ± 7).

Table No. 4: Comparisons of the mean scores of SF-36 between Renal Transplant Recipients and Kidney Disease Quality of Life (KDQOL)

Domain	Renal Transplant Recipients (SF-36)	KDQOL (Hypothetical)
Physical Health	68 ± 9	60 ± 8
Mental Health	62 ± 11	55 ± 7

DISCUSSION

The observed high prevalence (65%) of poor sleep quality among renal transplant recipients aligns with previous research, highlighting the vulnerability of transplant recipients to sleep disturbances. The identified issues, including difficulty falling asleep and frequent awakenings, underscore the multifactorial nature of sleep disruptions in this specific population[10]. The lower quality of life scores in both physical and mental health domains among participants with higher PSQI scores resonate with existing literature linking impaired sleep quality to compromised quality of life[11]. These findings emphasize the need for targeted interventions to address sleep disturbances and improve overall well-being[12].

Kidney transplantation recipients commonly experience poor sleep quality, with a study by Another study revealing that 62% of patients were classified as poor sleepers (PSQI > 5). This indicates challenges in falling asleep and frequent disruptions during sleep, potentially attributed to factors such as nocturnal bathroom visits,

discomfort, breathing difficulties, coughing, or loud snoring[13-15]. The use of immunosuppressive drugs post-transplantation, notably tacrolimus (FK506) and cyclosporine (CsA), may contribute to poor sleep quality due to their neurotoxic effects. Long-term use of these medications has been associated with adverse effects such as headaches, tremors, and insomnia, as reported in previous studies[16].

The significant improvement in PSQI scores among participants with medication changes suggests a potential role of immunosuppressive medications in influencing sleep quality. This finding prompts further investigation into specific mechanisms and the potential for medication adjustments to positively impact sleep outcomes[17]. Numerous factors can influence the quality of life among renal transplant recipients. This study underscores the significant impact of sleep quality on recipients' HRQOL, revealing that individuals classified as good sleepers exhibit markedly higher HRQOL compared to poor sleepers[18]. These findings suggest a positive correlation between good sleep quality and overall quality of life in this population. Additionally, investigation identified that the poor sleepers' cohort exhibited a higher total medical comorbidity score, increased bodily pain, poorer general mental health, and reduced physical function according to SF-36 assessments when compared to the good sleepers' group[19-20].

CONCLUSION

It is concluded that sleep disorders significantly impact the quality of life in renal transplant recipients, as evidenced by the high prevalence of poor sleep quality and its correlation with diminished physical and mental health. The study identifies age, gender, and comorbidities as key predictors, offering valuable insights for personalized interventions.

Author's Contribution:

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Conflict of Interest: The study has no conflict of interest to declare by any author.

Source of Funding: None

Ethical Approval: No.119-ERB-1044/2020 dated May 2020

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Original Article

Determination the Antibacterial Activity of Different Soil Samples in Erbil City

Mohammed Omar Abdullah

ABSTRACT

Objective: Antimicrobial drugs have become limited useful against nowadays pathogens; this was because of highly uptake and consumption of previously drugs which leads to gain the resistance potential by Pathogenic microbes generally and bacterial pathogens specifically. Aim of this study is testing antibacterial capability of soil extracts.
Study Design: Standard antibacterial testing procedure
Place and Duration of Study: This study was conducted at the Iraq, Erbil, Sami-Abdul Rahman Park from October 2023 to December 2023.
Methods: We obtained the antimicrobial effect directly from soil extract and three soil samples from: the indoor plant roots, the random plant root and the grass soil, and mix them with 9 ml of Distilled water, and we used Ciprofloxacin (CIP) as positive control, then they have been checked for their antibacterial activity by well diffusion methods in order to get the inhibition zones which indicate their antibacterial activity. Four standard strains of bacterial species were used in this study, which were K. pneumonia (ATCC 13883), P. mirabilis (ATCC 14153), E. faecalis (ATCC 29212) and S. pneumoniae (ATCC 6303).
Results: Only the random plant root soil sample has slightly effect against K. Pneumoniae and they didn't have effects on the rest of bacterial strains.
Conclusion: Only random tree roots soil has effect on K. pneumoniae which was (4 mm) of inhibition zone and they didn't have effect on the rest of bacterial strains.
Key Words: Soil, Antibacterial, Well, diffusion method

Citation of article: Abdullah MO. Determination the Antibacterial Activity of Different Soil Samples in Erbil City. Med Forum 2024;35(2):90-92. doi:10.60110/medforum.350220.

INTRODUCTION

The prevalence of antimicrobial resistance among microorganisms is currently a significant global threat. Antibacterial resistance is the prevailing form of resistance observed across microbial groups. It refers to a collection of defense mechanisms that certain harmful bacteria have evolved to withstand the presence of antibacterial medications. Despite the successful synthesis of numerous chemically synthetic chemicals by researchers, the problem of antibiotic resistance remains a global issue, and these compounds have not yet proven to be viable alternatives to previously used medications.[1-3]

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Received: January, 2024
Accepted: January, 2024
Printed: February, 2024

Streptococcus pneumoniae, which is acquired in the community, and Enterococcus faecalis, which is acquired in healthcare settings, are pathogens that urgently require alternative antibacterial medicines due to their high rates of resistance.[4,5] On the other hands, People with urinary tract infections (UTIs) often contract P. mirabilis, a member of this family that has quickly evolved multidrug-resistant (MDR) strains resistant to a wide range of medications.[6] Klebsiella is a type of gram-negative bacterium belonging to the Enterobacteriaceae family. It is responsible for causing many illnesses such as respiratory tract infections, urinary tract infections, septicemia, pneumonia, and soft tissue infections. Currently, K. pneumoniae has emerged as a highly hazardous pathogen acquired in hospitals, characterized by a significant prevalence of resistant strains such as multidrug-resistant (MDR) and extended-spectrum beta-lactamase (ESBL) strains of K. Pneumonia.[7]

Soil has many beneficial microbes which are responsible for producing a wide variety of antimicrobial secondary materials, and has been checked and isolated by scientists in order to check their activity against harmful microbes (pathogens).[8]

The objective of our study was to determine the antibacterial activity of three soil samples collected from both indoor and outdoor tree roots against four

different pathogenic bacteria: S. pneumonia, P. mirabilis, Klebsiella pneumonia and E. faecalis.

METHODS

Three soil samples have been collected in the three different places (near the indoor plant roots, the random plant root and the grass soil); Ciprofloxacin (CIP) was used as positive control and Distilled water as negative control. One gram from each samples were mixed with 9 ml of distilled water in order to dissolve all the microbial waste products into the water, then they were centrifuged to remove the unwanted soil particles, then were sterilized through 20 micrometer syringe filter (Minisart®, Biotech, USA). Stocked bacteria as being seen in Table 1 were reactivated in Nutrient Broth media, and then the bacterial numbers were adjusted to McFarland (0.5) turbidity by comparing with standard McFarland (0.5) tube.

To conduct the well-diffusion assay, swabs were spread out on Mueller Hinton agar plates from each bacterial suspension. After drying, 100µl of each soil extracts was poured into each well, along with a positive control (CIP) and a negative control (DW) on each plate. The plates were then incubated at 37°C for about 24 hours. When the incubation period is up, we look for distinct areas surrounding each well; these are the inhibition zones, which we compare to our positive control. The data was entered and analyzed through SPSS-26.

RESULTS

Following incubation in a well diffusion experiment for 24 hours, the inhibition zones surrounding each samples and its control on each plate were measured in millimeters using a ruler. These measurements were then compared to the two controls (positive control and negative control). Inhibition zone of all compounds with CIP is presented in (Table 2).

Out of three different soil samples from garden and indoor plant roots which have been checked against all our tested standard bacterial strains by using a standardized technique (well-diffusion). In the results, all soil samples didn't have any effect against all standard bacteria, in exception of K. pneumoniae, in which there is slightly effect against random tree roots soil extract. The inhibition zone mean for the affected sample was (4 mm). While on the other side, our positive control (CIP) showed inhibition effect, in which the inhibition zone mean vales were 19, 15, 10 and 7 mm for P. mirabilis, K. pneumoniae, E. Faecalis and S. pneumonia, respectively. The inhibition zone means value has been illustrated in (Fig. 1).

Table No.1: The bacterial species with their Standard codes

Bacterial species	ATCC Code
P. mirabilis	14153
K. pneumonia	13883
E. faecalis	29212
S. pneumonia	6303

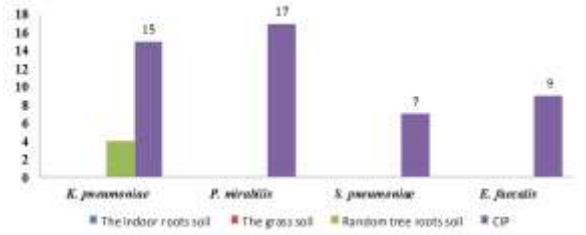

Figure No. 1: The inhibition zone Mean values for Soil samples and positive control (CIP)

Table No.2: Zone of inhibition of all Soil samples with Ciprofloxacin

Compound	Bacterial strains			
	K. pneumoniae	**P. mirabilis**	**S. pneumoniae**	**E. faecalis**
	Inhibition zone (mm)	Inhibition zone (mm)	Inhibition zone (mm)	Inhibition zone (mm)
The indoor roots soil	/	/	/	/
The grass soil	/	/	/	/
Random tree roots soil	4	/	/	/
CIP	15	19	7	10

DISCUSSION

After testing our soil extract samples by well diffusion method, we showed that they don't have direct antibacterial potential against all bacterial strains. Even though there was slightly effect against K. pneumoniae.

In the present study, opposite to other researches which has been done before, we were directly extract microbial secondary products from soil samples which were near the plants root. While in previous study, isolating bacteria or fungi from soil samples, then checked these microbes product individually against pathogens.[8]

Our study idea was designed on the fact that the soil has many microbes which are responsible to produce various antimicrobial, especially antibacterial such as explained in the study by Cycoń et al[9], but unfortunately the amount of by product solutes were not enough to have effect on our standard bacterial cultures.

K. pneumonia was the only tested bacteria which had the response against random tree roots sample extract, which indeed pointed to the closely relation of these bacteria with the other soil microbes such as shown in the study of Cruz-Córdova et al[10], while other bacteria represent the mostly resistant pathogenic bacteria that have many resistance mechanism against these soil extracts.

CONCLUSION

The increasing uptake and consumption of previously prescribed antimicrobial medications has led to the development of resistance in pathogenic microorganisms, particularly bacterial pathogens, and has reduced the efficacy of these treatments against modern infections. So regarding to this, we conducted our study to obtain antimicrobial effect directly from soil extract. In our study we obtained three soil samples and checked through a standardized antibacterial (well diffusion) methods in order to get the IZ and evaluate their potential against four common standard bacterial strains. In outcomes, our finding showed that only Random tree roots soil has effect on K. pneumoniae which was (4 mm) of inhibition zone and they didn't have effect on the rest of bacterial strains.

Author's Contribution:

Concept & Design of Study:	Mohammed Omar Abdullah
Drafting:	Mohammed Omar Abdullah
Data Analysis:	Mohammed Omar Abdullah
Revisiting Critically:	Mohammed Omar Abdullah
Final Approval of version:	Mohammed Omar Abdullah

Conflict of Interest: The study has no conflict of interest to declare by any author.

Source of Funding: None

Ethical Approval: No. 10/114 dated 25.09.2023

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Case Report

Management of a Nonvital Tooth with Grade 2 Mobility and Gingival Pus Discharge: A Case Report

Abdulaziz Abdulrahman Aleid

ABSTRACT

In the management of nonvital, mobile teeth and pus discharge in the gingival sulcus, an interdisciplinary holistic approach using a combination of endodontic and periodontal treatment could achieve success. The present case reports the management of a 30-year-old patient having a grade two mobility nonvital tooth and pus discharge from the gingival sulcus. Initial emergency care was provided followed by endodontic therapy started a week after therapy initiation. Three times during three weeks $Ca(OH)_2$ dressing was applied. It had been followed by obturation of the root canal system. Three-month follow-up revealed a considerable decrease in mobility of the tooth (grade 1) along with healthy gingival tissue. This particular case illustrates the need for interdisciplinary periodontal and endodontic therapies to enhance challenging clinical problems of nonvital teeth with relevant periodontal issues.

Key Words: Nonvital, Mobility, Pus Discharge, Endo - perio lesions

Citation of Case report: Aleid AA. Management of a Nonvital Tooth with Grade 2 Mobility and Gingival Pus Discharge: A Case Report. Med Forum 2024;35(2):93-95. doi:10.60110/medforum.350221.

INTRODUCTION

Endo-perio lesions represent the most frequent reason for difficult clinical situations for dental professionals. Because of the combined pulpal and periodontal pathologies, it frequently presents with diagnostic difficulties and difficulty in healing.[1] Some etiologies might be multifactorial such as bacterial infections, anatomical contacts or iatrogenic factors.[2] Diseases of the pulp mostly spread to the other concurrently or sequentially.[3] The pathogenesis of endo perio lesions should be apparent for control. These lesions could arise from the pulp and cause secondary periodontal issues (endo-origin) or they might develop as periodontal illnesses with secondary pulp tissue infection (perio-origin). Occasionally both periodontal and endodontic conditions show up concurrently but independently (true combined lesions).[4]

Their complexity necessitates a detailed diagnostic process including medical analysis, radiographic assessment, pulp vitality test and periodontal probing.[5] Endo-perio lesions require combined endodontic and periodontal management.

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Received: December, 2023
Accepted: January, 2024
Printed: February, 2024

This could include root canal therapy, periodontal therapy or both based on the cause and extent of the lesion. The prognosis of the disease is determined by the severity of the lesion, existing conditions and patient reaction to treatment. The current case illustrates the need for a combined endodontic and periodontal approach for the management of nonvital teeth mobility and pus discharge. The timely intervention and Ca(OH)2, which has antimicrobial properties and healing ability, were responsible for the success in this instance.

CASE PRESENTATION

A 30-year-old patient without any pertinent medical background reported to the Department of Diagnostics with dental concerns. The main complaint was grade 2 mobility of a tooth and active pus discharge from the gingival sulcus. Clinical examination found a nonvital tooth and an unpleasant odour of the area. The individual didn't report pain. A thorough clinical examination together with needed radiographic evaluations were performed to look at the scope of the periodontal and endodontic issues. Radiographs and clinical data demonstrated endodontic and periodontal intervention was needed.

The therapeutic strategy was utilized in several stages. Initially, acute symptoms were addressed. This initial phase was essential in controlling the discomfort and infection. Seven days later endodontic therapy was initiated. This comprised dressing and use of Calcium hydroxide (Ca(OH)2) three times more than 3 weeks. Calcium hydroxide was selected for its wound-healing and antibacterial functions.

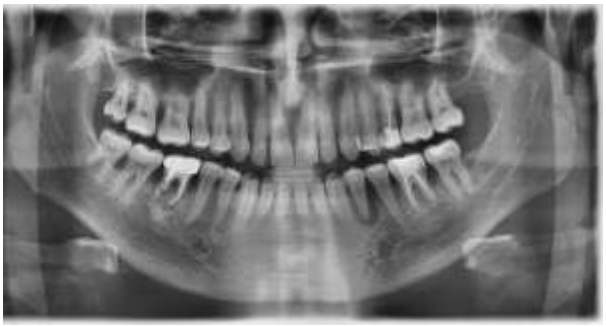

Figure No.1: Panoramic Radiograph Illustrating the Nonvital Tooth with Grade 2 Mobility

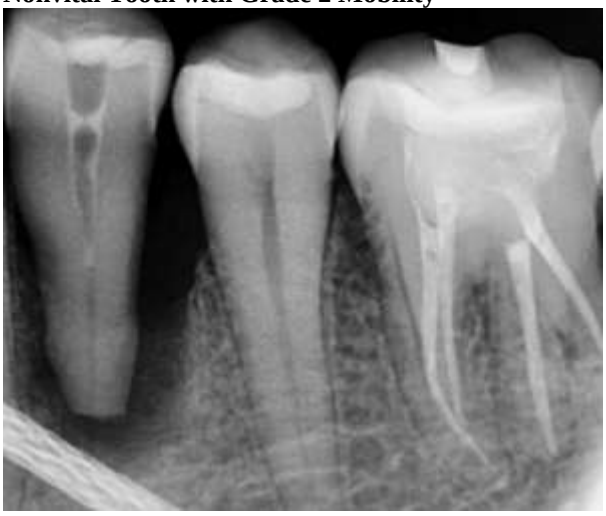

Figure No.2: Detailed Periapical Radiograph Showing the Extent of the Periodontal Disease

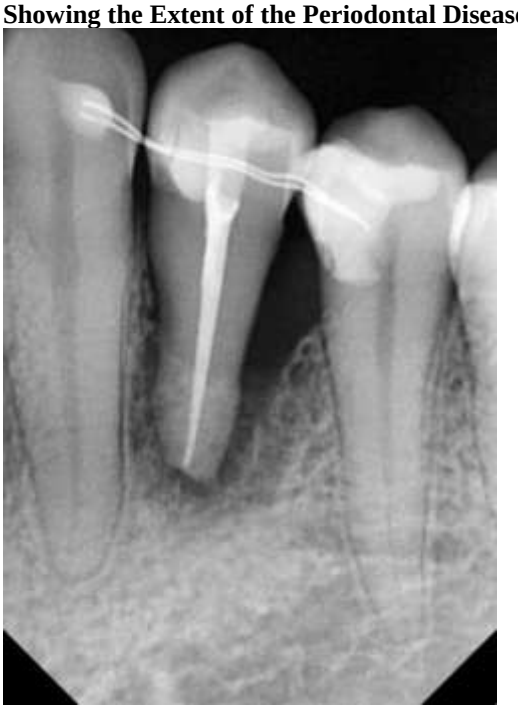

Figure No.3: Post-treatment Periapical Radiograph Demonstrating the Reduced Mobility and Healing Outcomes

Endodontic therapy was concluded by root canal system obturation. This closed the root canal and prevented additional bacterial infiltration. The patient had been then scheduled for a follow-up at three months 'time. This particular period demonstrated an improvement markedly. Periodontal stability was grade 1 with reduced tooth mobility. The gingival tissue around the tooth was also healthy and free from discharge. The patient also reported complete resolution of bad odour and no pain or discomfort with treatment teeth.

This particular case illustrates the importance of a holistic treatment of complicated endodontic and periodontal issues in tooth management. The successful outcome (reduced tooth mobility and resolution of infection symptoms) indicates therapeutic interventions chosen.

DISCUSSION

The case study describes the management of a grade 2 mobile nonvital tooth with gingival pus discharge. Moreover, this case study highlights the effectiveness of the combined approach of endodontic and periodontal treatment. It is essential to understand the pathogenesis, development and relationship of endo-perio lesions to treat them. Endodontic and periodontal treatments were needed as the patient was discharging pus from the gingival sulcus and giving off an unpleasant odour - both signs associated with a persistent infection.[6]

Since calcium hydroxide (Ca(OH)2) has the dual function of antibacterial activity and endotoxin neutralisation activity, it was considered a strategic alternative.[7] Concerning this specific instance, its ability to help recover periodontal tissues has also been beneficial here. There was a significant improvement during follow-up, tooth mobility decreased from grade 2 to grade 1. This improvement is possibly a consequence of the immediate treatment. This highlights the significance of considering endodontic health as an essential part of the treatment of endo perio issues.[8]

This case also shows that dental treatment must be multidisciplinary. While the main intervention was endodontic, the periodontal facet of the condition was also treated concurrently. This holistic approach allowed for the management of both the cause & and effect of the infection. Long-term therapy results were additionally included at 3 months follow-up. Symptom resolution and stabilization of the tooth indicated a great therapy response. Nevertheless, such cases must be managed often with follow-ups and maintenance to stay away from recurrence and to maintain the teeth healthy.[9]

CONCLUSION

Nonvital teeth with periodontal problems require comprehensive management. This case report illustrates that with proper endodontic and periodontal therapy a tooth that was grade 2 mobile and infected at presentation can be saved.

Author's Contribution:

Concept & Design of Study:	Abdulaziz Abdulrahman Aleid
Drafting:	Abdulaziz Abdulrahman Aleid
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Revisiting Critically:	Abdulaziz Abdulrahman Aleid
Final Approval of version:	Abdulaziz Abdulrahman Aleid

Conflict of Interest: The study has no conflict of interest to declare by any author.

Source of Funding: None

Ethical Approval: No.06-41-23 dated 05.06.2023

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